

unevaluated historic archaeological site (44PW1950) is located directly adjacent to the New Road Alternative Route right-of-way.

A single previously recorded archaeological site, 44PW1948, is located within the second portion of the New Road Alternative Route right-of-way. Additionally, one unevaluated historic archaeological site (44PW1950) is located directly adjacent to this alternative right-of-way. This is the same as the Wheeler Alternative Route; however, Site 44PW1950 is located approximately 20 feet from the right-of-way.

Three previously recorded archaeological sites (44PW0893, 44PW1853, and 44PW1854) are located within the Railroad Alternative Route right-of-way. Site 44PW0893 is a prehistoric camp, while sites 44PW1853 and 44PW1854 are both historic and prehistoric sites; none of the sites have been evaluated for listing in the NRHP.

### 3.4.2 Historic and Architectural Sites

D+A identified 431 previously recorded historic and architectural properties located in whole or part within the review areas. Of these resources, 12 are listed in the VLR and NRHP, 20 are eligible for listing in the NRHP, 148 have been determined not eligible for listing in the NRHP, and 251 are unevaluated. The unevaluated sites are considered potentially eligible by the VDHR. Additionally, nine of the previously recorded sites are registered as DHR Easements. These resources include houses, farms, commercial buildings, battlefields and other military sites, cemeteries, churches, schools, historic districts, bridges, and others.

Of the 431 previously recorded historic and architectural sites, 32 represent resource types considered within the tiered study area defined by the VDHR *Guidelines* and are discussed below (Figure 15 in Appendix C). Three of the 32 resources (Monroe House [076-0147], Store at Thoroughfare [076-0551], and Haynes House [076-0190]) have been destroyed. Monroe House is recorded in the VDHR files as eligible for listing in the NRHP, while Store at Thoroughfare and Haynes House are unevaluated. Given these resources were destroyed after they were first recorded, they are not considered (or counted as) constraints, since none of the routes considered would directly or indirectly affect these resources.

Of the remaining 29 resources considered, four are categorized as historic districts (Buckland Historic District and Boundary Increase [076-0313], Manassas National Battlefield Park Historic District [076-0271], Thoroughfare Historic District [076-5150], and Vint Hill Farms Station Historic District [030-0020]), which are comprised of a number of contributing and non-contributing resources. For the purposes of this routing study, these individual contributing or non-contributing resources were counted within the tiered study area and included in the summary below only if the individual resource is listed or eligible for listing in the NRHP, or is within the right-of-way of one of the route alternatives. Additionally, two of the 29 resources considered (Winterham [233-0008] and the Masonic Temple [233-5015]) are listed as NRHP-eligible in lieu of completing intensive level Phase II architectural inventories. According to the VDHR's Architectural Survey Forms, this was part of an agreement between the Virginia Department of Transportation and the DHR for the purposes of completing Section 106 consultation. None of the project alternatives are within 1.5 miles of a NHL; however, each route alternative has the potential to directly and indirectly affect NRHP-listed and -eligible properties, as well as other potentially significant resources. Summaries of the considered resources within the tiered study area of each route alternative are provided in Table 3.4.2-1.

Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

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TABLE 3.4.2-1

Haymarket Substation and 230 kV Transmission Line Project Historic and Architectural Resources Considered within the Tiered Buffer Zones as Specified in the VDHR Guidelines			
Route Alternative/ Site Number	Site Name	NRHP/PWC Status	Buffer (miles)
<b>Carver Road Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0122	Woodlawn	Eligible; CRHS <sup>d</sup>	0.0 to 0.5
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.0 to 0.5
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5
233-0005	Haymarket Post Office	Eligible	0.0 to 0.5
233-0008	Winterham	Eligible	0.0 to 0.5
233-5015	Masonic Temple	Eligible	0.0 to 0.5
<b>I-66 Hybrid Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
076-5381	Gainesville District School	Eligible	0.0 to 0.5
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.0 to 0.5
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5
233-0005	Haymarket Post Office	Eligible	0.0 to 0.5
233-0008	Winterham	Eligible	0.0 to 0.5
233-5015	Masonic Temple	Eligible	0.0 to 0.5
<b>I-66 Overhead Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
076-5381	Gainesville District School	Eligible	0.0 to 0.5
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.0 to 0.5
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5
233-0005	Haymarket Post Office	Eligible	0.0 to 0.5
233-0008	Winterham	Eligible	0.0 to 0.5
233-5015	Masonic Temple	Eligible	0.0 to 0.5
<b>Madison Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0

Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

151120002

TABLE 3.4.2-1 (cont'd)			
Haymarket Substation and 230 kV Transmission Line Project Historic and Architectural Resources Considered within the Tiered Buffer Zones as Specified in the VDHR Guidelines			
Route Alternative/ Site Number	Site Name	NRHP/PWC Status	Buffer (miles)
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0463	Site, James Madison Highway	Not Evaluated	0.0 (within ROW)
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5669	Single Dwelling, 15947 Thoroughfare Road	Not Evaluated	0.0 (within ROW)
076-0122	Woodlawn	Eligible; CRHS <sup>d</sup>	0.0 to 0.5
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.0 to 0.5
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5; 0.5 to 1.0
233-0008	Winterham	Eligible	0.0 to 0.5
076-0313	Buckland Historic District and Expansion	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.5 to 1.0
Northern Alternative			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5; 0.5 to 1.0
233-0005	Haymarket Post Office	Eligible	0.0 to 0.5
233-0008	Winterham	Eligible	0.0 to 0.5
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.5 to 1.0
New Road Alternative			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 to 0.5; 0.5 to 1.0
076-0015	Mount Atlas	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5
076-0178	The Lawn	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
076-0175	Greenwich Presbyterian Church	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.5 to 1.0
076-0088	Locust Bottom (Rollingwood Farm)	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.5 to 1.0
076-0313	Buckland Historic District and Expansion	Listed <sup>b</sup> ; CRHS <sup>e</sup>	0.0 to 0.5; 0.5 to 1.0
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.5 to 1.0
030-0020	Vint Hill Farms Station Historic District	Eligible	0.0 to 0.5
076-5150	Thoroughfare Historic District	Eligible; CRHS <sup>e</sup>	0.0 (within ROW); 0.0 to 0.5
076-0032	Buckland Hall (Buckland Farm/Tranquility)	Eligible <sup>a</sup> ; CRHS <sup>e</sup>	0.0 to 0.5
076-0095	Spencer-Vermillion House (Taylor/Gibson House)	Eligible	0.0 to 0.5
076-0469	Henry T. George Farm (Sunnyside Farm)	Eligible	0.0 to 0.5
076-0151	Southern Railway Depot at Thoroughfare (Repass Depot)	Eligible	0.0 to 0.5
076-0060	Old Log House	Not Evaluated	0.0 (within ROW)
076-5140	Primas Cemetery	Not Evaluated	0.0 (within ROW)

TABLE 3.4.2-1 (cont'd)			
Haymarket Substation and 230 kV Transmission Line Project Historic and Architectural Resources Considered within the Tiered Buffer Zones as Specified in the VDHR Guidelines			
Route Alternative/ Site Number	Site Name	NRHP/PWC Status	Buffer (miles)
076-5668	House, John Marshall Hwy	Not Evaluated	0.0 (within ROW)
<b>Railroad Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-0150	North Fork Steel Truss Bridge	Not Evaluated	0.0 (within ROW)
076-0271	Manassas National Battlefield Park Historic District	Listed <sup>b</sup> ; CRHS <sup>c</sup>	0.0 to 0.5; 0.5 to 1.0
076-5381	Gainesville District School	Eligible	0.0 to 0.5
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.0 to 0.5
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.0 to 0.5
233-0005	Haymarket Post Office	Eligible	0.0 to 0.5
233-0008	Winterham	Eligible	0.0 to 0.5
233-5015	Masonic Temple	Eligible	0.0 to 0.5
076-0122	Woodlawn	Eligible; CRHS <sup>d</sup>	0.0 to 0.5
<b>Wheeler Alternative</b>			
030-5152	Buckland Mills Battlefield	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Not Evaluated <sup>a</sup>	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5036	Manassas Station Operations	Eligible	0.0 (within ROW); 0.0 to 0.5; 0.5 to 1.0
076-5190	Second Battle of Manassas	Not Evaluated	0.0 to 0.5; 0.5 to 1.0
076-0178	The Lawn	Listed <sup>b</sup> ; CRHS <sup>c</sup>	0.0 to 0.5; 0.5 to 1.0
076-0175	Greenwich Presbyterian Church	Listed <sup>b</sup> ; CRHS <sup>c</sup>	0.0 to 0.5; 0.5 to 1.0
233-0002	St. Paul's Episcopal Church	Listed <sup>b</sup>	0.5 to 1.0
076-0313	Buckland Historic District and Expansion	Listed <sup>b</sup> ; CRHS <sup>c</sup>	0.0 to 0.5; 0.5 to 1.0
233-0006	Old Town Hall and Haymarket School	Listed <sup>b</sup>	0.5 to 1.0
030-0020	Vint Hill Farms Station Historic District	Eligible	0.0 to 0.5
076-5150	Thoroughfare Historic District	Eligible; CRHS <sup>c</sup>	0.0 (within ROW); 0.0 to 0.5
076-0032	Buckland Hall (Buckland Farm/Tranquility)	Eligible <sup>a</sup> ; CRHS <sup>c</sup>	0.0 to 0.5
076-0151	Southern Railway Depot at Thoroughfare (Repass Depot)	Eligible	0.0 to 0.5
076-5140	Primas Cemetery	Not Evaluated	0.0 (within ROW)
076-5668	House, John Marshall Hwy	Not Evaluated	0.0 (within ROW)
<sup>a</sup> A portion of Thoroughfare Gap Battlefield is listed on the NRHP and VLR. This portion has been assigned a separate site number (030-1016) by the VDHR. <sup>b</sup> Resource listed on the NRHP and VLR. <sup>c</sup> Prince William County Registered Historic Site <sup>d</sup> Eligible Prince William County Registered Historic Site <sup>e</sup> DHR Easement.			

#### Carver Road Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the Carver Road Alternative Route. These include the NRHP-eligible Buckland Mills Battlefield

(030- 5152) and Manassas Station Operations Battlefield (076-5036), and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the Carver Road Alternative Route and the U.S. 29 corridor crossing just south of I-66. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the Carver Road Alternative Route.

Manassas Station Operations study area is crossed by the route near the proposed Haymarket Substation and just north of U.S. 29. While the battlefield study area is crossed by the route and falls within the 0.5- and 1.0-mile buffers, the core area of the battlefield and potential NRHP boundaries are over four miles to the south of the Carver Road Alternative Route.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield are over two miles to the west of the Carver Road Alternative Route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0- mile buffers at the eastern end of the Carver Road Alternative Route. Additionally, NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

A single previously recorded historic district, Manassas National Battlefield Park Historic District (076-0271) is located within the 0.5-mile and 1.0-mile buffers of the Carver Road Alternative Route. Manassas National Battlefield Park Historic District is listed in the NRHP and VLR, and is classified by Prince William County as a County Registered Historic Site. Two NRHP-listed properties (St. Paul's Episcopal Church [233-0002] and the Old Town Hall and School [233-0006]) and four NRHP-eligible properties (Woodlawn [076-0122], Haymarket Post Office [233-0005], Winterham [233-0008] and the Masonic Temple [233-5015]) are located within the 0.5-mile buffer of the Carver Road Alternative Route. Woodlawn is also designated by Prince William County as an Eligible County Registered Historic Site. Additionally, 25 unevaluated architectural properties are located within the 0.5-mile buffer of the Carver Road Alternative Route. With the exception of the battlefields, no architectural or historic resources unevaluated, listed or eligible for listing in the NRHP are located within the right-of-way of the Carver Road Alternative Route.

#### I-66 Hybrid Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the I-66 Hybrid Alternative Route. These include the NRHP-eligible Buckland Mills Battlefield (030-5152) and Manassas Station Operations Battlefield (076-5036), and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the I-66 Hybrid Alternative Route and the U.S. 29 corridor crossing just south of I-66. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the I-66 Hybrid Alternative Route.

Manassas Station Operations study area runs parallel to I-66 and crosses the western end of the I-66 Hybrid Alternative Route. While the battlefield study area is crossed by the route and falls within the 0.5- and 1.0-mile buffer, the core area of the battlefield and potential NRHP boundaries are over four miles to the south of the I-66 Hybrid Alternative Route.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield, however, are over two miles to the west of the I-66 Hybrid Alternative Route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. The core area and potential NRHP portions of the battlefield are crossed by the I-66 Hybrid Alternative Route and fall within the 0.5- and 1.0-mile buffer of the route. NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

A single previously recorded historic district, Manassas National Battlefield Park Historic District (076-0271) is located within the 0.5-mile and 1.0-mile buffers of the I-66 Hybrid Alternative Route. Manassas National Battlefield Park Historic District is listed in the NRHP and VLR, and is classified by Prince William County as a County Registered Historic Site. Two NRHP-listed properties (St. Paul's Episcopal Church [233-0002] and the Old Town Hall and School [233-0006]) and four NRHP-eligible properties (Masonic Temple [233-5015], Gainesville District School [076-5381], Haymarket Post Office [233-0005], and Winterham [233-0008]) are located within the 0.5-mile buffer of the I-66 Hybrid Alternative Route. Additionally, 21 unevaluated architectural properties are located within the 0.5-mile buffer of the I-66 Hybrid Alternative Route. With the exception of the battlefields, no architectural or historic resources unevaluated, listed or eligible for listing in the NRHP are located within the right-of-way of the I-66 Hybrid Alternative Route. The I-66 Hybrid Alternative Route does, however, cross a single locally-designated historic district. The Old and Historic Town of Haymarket was adopted by the Haymarket Town Council in 1994 when the council placed the area within the corporate limits of the Town of Haymarket under a Historic District Zoning Ordinance (Town of Haymarket, 2014). The historic overlay district was established to provide protection specific to the town's historic resources. A portion of the Old and Historic Town of Haymarket (Haymarket Historic District [233-5002]) was assessed for NRHP eligibility; however, the VDHR determined the district was not eligible for listing in the NRHP in 2004.

#### I-66 Overhead Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the I-66 Overhead Alternative Route. These include the NRHP-eligible Buckland Mills (030-5152) and Manassas Station Operations (076-5036) battlefields, and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the I-66 Overhead Alternative Route and the U.S. 29 corridor crossing just south of I-66. Core areas and potential NRHP-eligible portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the route.

Manassas Station Operations study area runs parallel to I-66 and crosses the western end of the I-66 Overhead Alternative Route. While the battlefield study area is crossed by the route

and falls within the 0.5- and 1.0-mile buffer, the core area of the battlefield and potential NRHP boundaries are over four miles to the south of the route.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield are over two miles to the west of the I-66 Overhead Alternative Route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. The core area and potential NRHP portions of the battlefield are crossed by the I-66 Overhead Alternative Route and fall within the 0.5- and 1.0-mile buffer of the route. NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

A single previously recorded historic district, Manassas National Battlefield Park Historic District (076-0271) is located within the 0.5-mile and 1.0-mile buffers of the I-66 Overhead Alternative Route. Manassas National Battlefield Park Historic District is listed in the NRHP and VLR, and is classified by Prince William County as a County Registered Historic Site. Two NRHP-listed properties (St. Paul's Episcopal Church [233-0002] and the Old Town Hall and School [233-0006]) and four NRHP-eligible properties (Masonic Temple [233-5015], Gainesville District School [076-5381], Haymarket Post Office [233-0005], and Winterham [233-0008]) are located within the 0.5-mile buffer of the I-66 Overhead Alternative Route. Additionally, 21 unevaluated architectural properties are located within the 0.5-mile buffer of the I-66 Overhead Alternative Route. With the exception of the battlefields, no architectural or historic resources unevaluated, listed or eligible for listing in the NRHP are located within the right-of-way of the I-66 Overhead Alternative Route. The I-66 Overhead Alternative Route does, however, cross a single locally-designated historic district: The Old and Historic Town of Haymarket.

#### Madison Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the Madison Alternative Route. These include the NRHP-eligible Buckland Mills (030-5152) and Manassas Station Operations (076-5036) battlefields, and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the Madison Alternative Route and the U.S. 29 corridor crossing just south of I-66. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the route.

Manassas Station Operations study area is crossed by the route near the proposed Haymarket Substation and just north of U.S. 29. While the battlefield study area is crossed by the route and falls within the 0.5- and 1.0-mile buffers, the core area of the battlefield and potential NRHP boundaries are over four miles to the south of the Madison Alternative Route.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield are over two miles to the west of the route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. The core area and potential NRHP portions of the battlefield are crossed by the Madison Alternative Route and fall within the 0.5- and 1.0-mile buffer of the route. NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

Two previously recorded historic districts, Manassas National Battlefield Park Historic District (076-0271) and Buckland Historic District (076-0313), are located within the 1.0-mile buffer of the Madison Alternative Route. Both historic districts are classified by Prince William County as County Registered Historic Sites and are listed on the NRHP and VLR. Manassas National Battlefield Park Historic District is also located within the 0.5-mile buffer of the Madison Alternative Route along with two NRHP-listed properties (St. Paul's Episcopal Church [233-0002] and the Old Town Hall and School [233-0006]) and two NRHP-eligible properties (Woodlawn [076-0122] and Winterham [233-0008]). The Old Town Hall and School is also located within the 1.0-mile buffer. Woodlawn is designated by Prince William County as an Eligible County Registered Historic Site. Additionally, 31 unevaluated architectural properties are located within the 0.5-mile buffer of the Madison Alternative Route, two of which (076-0463 and 076-5669) are also located within the right-of-way.

#### Northern Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the Northern Alternative Route. These include the NRHP-eligible Buckland Mills (030-5152) and Manassas Station Operations (076-5036) battlefields, and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the Northern Alternative Route. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the Northern Alternative Route.

Manassas Station Operations study area runs parallel to I-66 and crosses the western terminus of the Northern Alternative Route. While the battlefield study area is crossed by the route and falls within the 0.5- and 1.0-mile buffer, the core area of the battlefield and potential NRHP boundaries are over four 4.0 miles to the south.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield are over two miles to the west of the Northern Alternative Route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. The core area and potential NRHP portions of the battlefield are crossed by the Northern Alternative Route and fall within the 0.5- and 1.0-mile buffer of the route. NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

Two NRHP- and VLR-listed properties (St. Paul's Episcopal Church [233-0002] and Old Town Hall and School [233-0006]) and one previously recorded historic district (Manassas National



Battlefield Park Historic District [076-0271]) are located within the 1.0-mile buffer of the Northern Alternative Route. Manassas National Battlefield Park Historic District is also listed in the NRHP and VLR, and is classified by Prince William County as County Registered Historic Site. Additionally, Old Town Hall and School and Manassas National Battlefield Park Historic District are located within the 0.5-mile buffer of the Northern Alternative Route along with two NRHP-eligible properties (Haymarket Post Office [233-0005] and Winterham [233-0008]). A total of seven unevaluated architectural properties are located within the 0.5-mile buffer of the Northern Alternative. With the exception of the battlefields, no architectural or historic resources unevaluated, listed or eligible for listing in the NRHP are located within the right-of-way of the Northern Alternative Route.

#### New Road Alternative Route (New Road-Haymarket)

Three battlefields (Manassas Station Operations Battlefield [076-5036], Buckland Mills Battlefield [030-5152], and Thoroughfare Gap Battlefield [030-1016]) are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the New Road Alternative Route. Additionally, Second Battle of Manassas (076-5190) is located within the 0.5-mile and 1.0-mile buffers.

Buckland Mills Battlefield study areas, core areas and potential NRHP boundaries are crossed by the southern portion of the New Road Alternative Route and where the route crosses and parallels I-66. The battlefield also falls within the 0.5- and 1.0-mile buffers of the route. The Manassas Station Operations study area is crossed by the portion of the route where it parallels Interstate 66, and falls within the 0.5- and 1.0-mile buffers; however, the core area of the battlefield and potential NRHP boundaries are over five miles to the southeast. Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the portion of the New Road Alternative Route where it parallels I-66. These boundaries also fall within the 0.5- and 1.0-mile buffers of the route. The core area of the battlefield falls within the 1.0-mile buffer, while the NRHP-listed boundary is over one mile to the west. The Second Battle of Manassas study area falls within the 0.5- and 1.0-mile buffer of the New Road Alternative Route; however, the core area of the battlefield and potential NRHP boundaries are over three miles to the east.

Two NRHP-eligible historic districts (Vint Hill Farms Station Historic District [030-0020] and Thoroughfare Historic District [076-5150]) are located within the 0.5-mile buffer of the New Road Alternative Route; Thoroughfare Historic District is also located within the right-of-way. Additionally, Buckland Historic District and Boundary Increase (076-0313), which is listed in the VLR and NRHP, is located within the 0.5- and 1.0-mile buffers. Portions of Buckland Historic District and Expansion are classified by Prince William County as a County Registered Historic Site and a Historic Overlay District. Portions of Thoroughfare Historic District are also classified by Prince William County as a County Registered Historic District; however, the New Road Alternative Route right-of-way is approximately 17 feet from the edge of the historic district boundary as defined by Prince William County.

Five NRHP- and VLR-listed properties (The Lawn [076-0178], St. Paul's Episcopal Church [233-0002], Greenwich Presbyterian Church & Cemetery [076-0175], Locust Bottom [076-0088], and Old Town Hall and School [233-0006]) are located within the 1.0-mile buffer of New Road Alternative Route. The Lawn and Greenwich Presbyterian Church & Cemetery, along with the NRHP- and VLR-listed Mount Atlas (076-0015) are located within the 0.5-mile buffer. Four NRHP-eligible properties (Buckland Hall [076-0032], Spencer-Vermillion House [076-0095], Henry T. George Farm [076-0469], and Southern Railway Depot at Thoroughfare [076-0151]) are also located within the 0.5-mile buffer of the New Road Alternative Route. Southern

Railway Depot at Thoroughfare is located entirely within the Thoroughfare Historic District. Additionally, 76 unevaluated architectural properties are located within 0.5-mile of the New Road Alternative Route.

Greenwich Presbyterian Church & Cemetery, the Lawn, Mount Atlas, Locust Bottom, and Buckland Hall are classified by Prince William County as County Registered Historic Sites. Buckland Hall, which is located in part within the Buckland Historic District and Boundary Increase, is also under a historic preservation held by the VDHR and an open space easement. In addition to Buckland Hall, there are several conservation easements associated with the Buckland Mills Battlefield or the Buckland Historic District and Boundary Increase located between 0.1 and 1.0 mile of the New Road Alternative Route. These conservation easements include historic preservation and open-space easements and are administered by the VDHR through its Historic Preservation Easement Program and through the Land and Water Conservation Fund Act (16 U.S.C 4601-6(f)(3)) Civil War Battlefield Land Acquisition Grants awarded by the NPS ABPP. Of these conservation easements, eight have been assigned VDHR IDs and are currently recorded as unevaluated for listing in the NRHP: Buckland Commons (076-0313-0049); Tract, 7810 James Madison Highway (076-0313-0050); Broad Run Tract (076-1313-0051); Cerro Gordo tract (076-0313-0052); Buckland Tavern (076-0033); Buckland Grist Mill (076-0112); Samuel Love's Store (076-0113); and John Trone House (076-0123). None of these conservation easements associated with Buckland Mills Battlefield or the Buckland Historic District and Boundary Increase are crossed by the New Road Alternative Route right-of-way.

With the exception of the battlefields and historic district, no architectural or historic resources listed or eligible for listing in the NRHP are located within the right-of-way of the New Road Alternative Route; however three unevaluated architectural properties (House, John Marshall Hwy [076-5668], Old Log House [076-0060], and Primas Cemetery [076-5140]) are crossed by the right-of-way. Primas Cemetery is located entirely within the Thoroughfare Historic District.

#### Railroad Alternative Route (Gainesville-Haymarket)

Four battlefields are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the Railroad Alternative Route. These include the NRHP-eligible Buckland Mills (030-5152) and Manassas Station Operations (076-5036) battlefields, and the unevaluated Thoroughfare Gap Battlefield (030-5610) and Second Battle of Manassas (076-5190).

Buckland Mills Battlefield study area encompasses the western portion of the Railroad Alternative Route and the U.S. 29 corridor crossing just south of I-66. Core areas and potential NRHP portions of the battlefield are crossed by the right-of-way and fall within the 0.5- and 1.0-mile buffers at the western end of the Railroad Alternative Route.

Manassas Station Operations study area runs parallel to the Railroad Alternative Route and is crossed by the route near the proposed Haymarket Substation and just north of U.S. 29. While the battlefield study area is crossed by the route and falls within the 0.5- and 1.0-mile buffers, the core area of the battlefield and potential NRHP boundaries are over four miles to the south.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the western end of the route near the proposed Haymarket Substation and fall within the 0.5- and 1.0-mile buffers. The core area and existing NRHP-listed boundaries of the battlefield are over two miles to the west of the Railroad Alternative Route.

The Second Battle of Manassas study area runs parallel to I-66 and is crossed by the route just north of U.S. 29 and again at the eastern end of the route. A large portion of the battlefield is located within the Manassas National Battlefield Park Historic District, which is listed in the NRHP. The core area and potential NRHP portions of the battlefield are crossed by the Railroad Alternative Route and fall within the 0.5- and 1.0-mile buffer of the route. NRHP-listed portions of the battlefield are located within the 0.5- and 1.0-mile buffers.

A single previously recorded historic district, Manassas National Battlefield Park Historic District (076-0271) is located within the 0.5-mile and 1.0-mile buffers of the Railroad Alternative Route. Manassas National Battlefield Park Historic District is listed in the NRHP and VLR, and is classified by Prince William County as a County Registered Historic Site. Two NRHP-listed properties (St. Paul's Episcopal Church [233-0002] and the Old Town Hall and School [233-0006]) and five NRHP-eligible properties (Woodlawn [076-0122], Gainesville District School [076-5381], Haymarket Post Office [233-0005], Winterham [233-0008] and the Masonic Temple [233-5015]) are located within the 0.5-mile buffer. Woodlawn is also designated by Prince William County as an Eligible County Registered Historic Site. Additionally, 32 unevaluated architectural properties are located within 0.5-mile of the Railroad Alternative Route. With the exception of the battlefields, no architectural or historic resources listed or eligible for listing in the NRHP are located within the right-of-way of the Railroad Alternative Route; however, one unevaluated architectural resource (North Fork Steel Truss Bridge #6013 [076-0150]) is located within the right-of-way. The Old and Historic Town of Haymarket, a locally-designated historic district, is also located within the Railroad Alternative right-of-way.

#### Wheeler Alternative Route (Wheeler-Haymarket)

Three battlefields (Manassas Station Operations Battlefield [076-5036], Buckland Mills Battlefield [030-5152], and Thoroughfare Gap Battlefield [030-1016]) are located within the right-of-way and the 0.5-mile and 1.0-mile buffers of the Wheeler Alternative Route. Additionally, the Second Battle of Manassas (076-5190) is located within the 0.5-mile and 1.0-mile buffers of the Wheeler Alternative Route.

Buckland Mills Battlefield study areas, core areas and potential NRHP boundaries are crossed by the southern and northern ends of the Wheeler Alternative and fall within the 0.5- and 1.0-mile buffers. The Manassas Station Operations study area is crossed by the northern portion of the route where it parallels I-66, and falls within the 0.5- and 1.0-mile buffers; however, the core area of the battlefield and potentially eligible NRHP boundaries are over five miles to the southeast. Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the portion of the New Road Alternative Route where it parallels I-66 and fall within the 0.5- and 1.0- mile buffers. The core area of the battlefield falls within the 1.0-mile buffer, while the NRHP-listed boundary is over one mile to the west. The Second Battle of Manassas study area falls within the 0.5- and 1.0-mile buffer of the Wheeler Alternative Route; however, the core area of the battlefield and potential NRHP boundaries are over three miles to the east.

Two NRHP-eligible historic districts (Vint Hill Farms Station Historic District [030-0020] and Thoroughfare Historic District [076-5150]) are located within the 0.5-mile buffer of the Wheeler Alternative Route; Thoroughfare Historic District is also located within the right-of-way. Additionally, Buckland Historic District and Boundary Increase (076-0313), which is listed in the VLR and NRHP, is located within the 0.5-mile and 1.0-mile buffers. Portions of both Buckland Historic District and Thoroughfare Historic District are classified by Prince William County as County Registered Historic Sites; however, the Wheeler Alternative right-of-way is

approximately 17 feet outside of the Thoroughfare Historic District boundary as defined by Prince William County. Prince William County also designated portions of the Buckland Historic District and Boundary Increase as a Historic Overlay District.

Four NRHP- and VLR-listed properties (The Lawn [076-0178], St. Paul's Episcopal Church [233- 0002], Greenwich Presbyterian Church & Cemetery [076-0175], and Old Town Hall and School [233-0006]) are located within the 1.0-mile buffer of Wheeler Alternative Route. Additionally, The Lawn and Greenwich Presbyterian Church & Cemetery are located within the 0.5-mile buffer. Two NRHP-eligible properties (Buckland Hall [076-0032] and Southern Railway Depot at Thoroughfare [076-0151]) are located within the 0.5-mile buffer of the Wheeler Alternative Route. Southern Railway Depot at Thoroughfare is located entirely within the Thoroughfare Historic District. Additionally, 49 unevaluated architectural properties are located within 0.5-mile of the Wheeler Alternative.

Greenwich Presbyterian Church & Cemetery, the Lawn, and Buckland Hall are classified by Prince William County as County Registered Historic Sites. Buckland Hall, which is located in part within the Buckland Historic District and Boundary Increase, is also under a historic preservation held by the VDHR and an open space easement. In addition to Buckland Hall, there are eight unevaluated sites under VDHR Easements within 1.5-miles of the Wheeler Alternative route: Buckland Commons (076-0313-0049); Tract, 7810 James Madison Highway (076- 0313- 0050); Broad Run Tract (076-1313-0051); Cerro Gordo tract (076-0313-0052); Buckland Tavern (076-0033); Buckland Grist Mill (076-0112); Samuel Love's Store (076-0113); and John Trone House (076-0123). These sites are associated with the Buckland Mills Battlefield or the Buckland Historic District and Boundary Increase.

With the exception of the battlefields and historic district, no architectural or historic resources listed or eligible for listing in the NRHP are located within the right-of-way of the Wheeler Alternative Route; however two unevaluated architectural properties (House, John Marshall Hwy [076-5668] and Primas Cemetery [076-5140]) are crossed by the right-of-way. Primas Cemetery is located entirely within the Thoroughfare Historic District.

### **3.4.3 Prehistoric and Historic Sensitivity Areas**

Two Prehistoric High Sensitivity Areas are crossed by the first portion of the New Road Alternative Route. These Prehistoric High Sensitivity Areas are associated with Chestnut Lick and Bull Run streams and are crossed by 0.4 mile of the New Road Alternative Route. Historic High Sensitivity Areas are found to the south of I-66 between U.S. 15 and U.S. 29 and are crossed by 0.4 mile of the Carver Road Alternative and Madison Alternative Routes, 0.3 mile of the I-66 Hybrid Alternative Route, and 0.9 mile of the Railroad Alternative Route. Prehistoric and Historic High Sensitivity Areas are depicted on Figure 16 in Appendix C.

### **3.4.4 Summary of Existing Survey Data Performed Under Section 106 or Section 110 of the National Historic Preservation Act**

The VDHR files document 29 cultural resource investigations conducted in whole or part within the eight route alternative rights-of-way for projects completed under Sections 106 or 110 of the NHPA. A significant amount of previous cultural resource survey coverage associated with areas along I-66, U.S. 29, U.S. 15, and areas south of John Marshall Highway (SR 55) between U.S. 15 and U.S. 29 overlap portions of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes. Previous cultural resource survey coverage for the New Road Alternative and Wheeler

Alternative Routes is minimal, with the majority of the survey coverage located along the I-66 corridor, the northern end of the New Road Alternative Route, and the southern end of the Wheeler Alternative Route.

Under the authority of the American Battlefield Protection Program Act of 1996, the Department of Interior is directed to provide updates to the CWSAC on the status of nationally-significant Civil War battlefields. In Virginia, the ABPP conducted a field assessment of several battlefields to identify the historic extent of the battle (study area), the areas of fighting on the battlefield (core area located within the study area), and potential National Register boundaries. The results of this study were presented to the CWSAC in 2009. The study areas of four battlefields, Buckland Mills Battlefield, Manassas Station Operations Battlefield, Thoroughfare Gap Battlefield, and the Second Battle of Manassas, are crossed by the Project components and are depicted on Figure 17 in Appendix C.

### **3.5 Geological Constraints**

A single surface operation is located within 0.25 mile of any route alternatives. Dalrymple Companies operates Cedar Mountain Stone and Chemung Contracting west of University Boulevard just south of the Norfolk Southern Railroad in the Piney Branch Industrial Park. The tracts containing the stone operation are limited to an approximately 24-acre area.

### **3.6 Engineering Constraints**

Crossings of existing transportation infrastructure and electric transmission or distribution facilities were identified as engineering constraints due to increased costs for positioning towers or poles on either side of crossings. In some cases, for example, taller towers or poles are needed to facilitate these crossings. Also, when potential routes were identified parallel and adjacent to electric transmission or distribution lines, separation from the existing facilities was considered to ensure that the current Project meets or exceeds Dominion's reliability standards. Due to the developed nature of the study area, there may be insufficient space in some areas to route a new transmission line in close proximity to existing facilities.

### **3.7 Existing Corridors within the Project Area**

NRG identified existing corridors within the project area through review of USGS topographic quadrangles, recent (2011) digital aerial photography, the Prince William County, Fauquier County, Loudoun County, and Town of Haymarket Comprehensive Plans, and various publicly-available data layers. Existing corridors within the Project area that were identified consist of existing electric transmission and pipeline facilities, railroad corridors, and major road corridors. These existing corridors are described below and depicted on Figure 18 in Appendix C. The existing corridors were identified for the purpose of assessing their potential use as routing or collocation opportunities in the portions of the Project area where new or different rights-of-way would be required. These existing corridors are described below.

#### **3.7.1 Electric Transmission Corridors**

A segment of a designated utility corridor (identified in the Prince William County Comprehensive Plan) is present just east of the proposed tie-in location near Cushing Road. The corridor originates at the Loudoun County border heading south across Sudley Road (SR 234), Lee Highway (U.S. 29), I-66, Prince William Parkway (SR 234), Nokesville Road (SR 28) and ending at the Fauquier County line. Given the north-south orientation of the corridor and the east-west nature of the project, this corridor does not provide an opportunity for the Project.

Existing electric transmission or distribution facilities are found throughout the Project area. Dominion has an existing 115 kV transmission line extending north-south along the eastern edge of the Project area. This existing transmission line will serve as the beginning tie-in location for all of the alternatives except the New Road Alternative Route. Other smaller transmission lines occur sporadically throughout the Project area and distribution lines are prevalent.

### **3.7.2 Railroad Corridors**

The Norfolk Southern Railroad runs through the Project area. Within the Project area the railroad is located south of Prince William Parkway (SR 234) in Wellington and heads northwest following the south side of I-66. The railroad then follows Lee Highway (U.S. 29) into Gainesville and then continues along the North Fork of Broad Run through the Town of Haymarket. The railroad then crosses James Madison Highway and continues to parallel the North Fork of Broad Run until it crosses John Marshall Highway and I-66 heading away from the route alternatives. The railroad is crossed multiple times by most route alternatives and provided a routing colocation opportunity for some of the alternatives.

### **3.7.3 Pipeline Corridors**

Two pipeline rights-of-way are within the Project area. The first is a Dominion Transmission Inc. pipeline that runs north/south just east of the tie-in location along Cushing Road. The pipeline runs primarily within the designated utility corridor identified above. The second is a Columbia Gas Transmission pipeline that runs northeast to southwest across the Project area. Although some of these facilities initially were considered a potential routing opportunity, in some places there is insufficient space to route new lines due to congestion with existing utilities or the presence of land use (including residential) and environmental constraints.

### **3.7.4 Major Road Corridors**

Major road corridors in the Project area includes I-66, James Madison Highway (U.S. 15), John Marshall Highway (SR 55), Linton Hall Road (SR 619), Lee Highway (U.S. 29), Prince William Parkway (SR 234), Heathcote Boulevard (SR 2502), Sudley Road (SR 234), Waterfall Road (SR 601), Vint Hill Road (SR 215), Broad Run Church Road (SR 600), and Wellington Road (SR 674). There are many more roads located within the Project area. Road rights-of-way were considered potential routing opportunities, although constructing and operating a transmission line within road rights-of-way, especially those that are considered 'limited access' such as portions of the I-66 right-of-way, can require certain limitations on those activities.

## **4.0 RESOURCES AFFECTED**

Environmental conditions along each of the alternative routes were identified, mapped, and reviewed as discussed in Section 3.0. Refer to Table 3-1 for a list of environmental features considered during the evaluation process. To further evaluate and consider the environmental advantages and disadvantages of each alternative route, the environmental features potentially affected by these alternatives were quantified for comparison purposes. A quantified environmental features comparison table for the eight alternative routes considered is presented in Table 4-1. The locations of all alternative routes are described in Section 2.1. A discussion and comparison of each route's environmental advantages and disadvantages is presented below.

Haymarket Substation and 230 kV Transmission Line Project  
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TABLE 4-1 Haymarket Substation and 230 kV Transmission Line Project Environmental Features Comparison Table									
Environmental Features	Unit	Carver Road Alternative	I-66 Hybrid Alternative	I-66 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative *
<b>Land Use Features / Constraints</b>									
Land Ownership Crossed (total length)	miles	6.7	5.3	5.0	8.2	21.2	6.1	5.7	8.6
State Owned Lands	miles	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Local Government Lands	miles	<0.1	0.1	0.1	0.0	<0.1	0.0	0.0	<0.1
Prince William County Dedicated Roads	miles	<0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Town of Manassas	miles	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	0.1
Private Lands Crossed (total)	miles	4.7	2.6	1.8	5.4	20.7	4.1	3.7	8.5
Prince William County	miles	4.7	2.3	1.5	5.4	16.9	4.1	3.5	3.2
Fauquier County	miles	0.0	0.0	0.0	0.0	3.2	0.0	0.0	5.3
Loudoun County	miles	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Haymarket Township	miles	0.0	0.3	0.3	0.0	0.0	0.0	0.2	0.0
Virginia DOT Crossings (roads) <sup>b</sup>	miles	2.0	2.6	3.1	2.8	0.5	1.1	2.0	0.1
Private Parcels Crossed by Right-of-Way (total)	number	75	35	36	75	175	26	43	72
Prince William County	number	75	24	23	75	137	26	39	45
Fauquier County	number	0	0	0	0	27	0	0	27
Loudoun County	number	0	0	0	0	11	0	0	0
Town of Haymarket	number	0	11	13	0	0	0	4	0
<b>Recreational Areas Crossed</b>									
County, Municipal, or Private Recreation Areas Crossed	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	<0.1 (1)	1.8 (3)	0.0 (0)	0.0 (0)
Virginia Birding and Wildlife Trail Crossed	number	2	6	4	2	3	2	2	2
<b>Existing Land Use (VDOF)</b>									
Open Land	miles	0.1	0.1	<0.1	0.1	0.5	0.0	0.1	0.3
Cropland	miles	<0.1	0.1	0.2	0.3	5.6	0.3	0.1	2.0
Developed	miles	2.8	3.5	3.4	3.4	5.4	2.2	2.6	2.2
Forested	miles	3.8	1.6	1.4	4.4	9.6	3.6	2.9	4.1
Water	miles	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Zoning									
Agricultural	miles	4.0	2.8	3.3	6.0	19.6	2.7	2.7	8.1

Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

TABLE 4-1 (cont'd)

Haymarket Substation and 230 kV Transmission Line Project Environmental Features Comparison Table									
Environmental Features	Unit	Carver Road Alternative	I-66 Hybrid Alternative	I-66 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative*
Business/Commercial	miles	0.9	0.7	0.2	1.0	0.0	0.1	0.7	0.0
Conservation	miles	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Industrial	miles	0.8	0.5	0.4	0.8	0.0	<0.1	0.8	0.0
Planned Business District	miles	0.2	0.1	0.1	0.2	0.9	0.4	0.2	0.5
Planned Mixed District	miles	0.1	0.1	0.3	0.1	0.0	0.4	0.1	0.0
Planned Mixed Residential	miles	0.0	0.2	0.1	0.0	0.0	2.2	0.0	0.0
Residential	miles	0.7	0.2	<0.1	0.1	0.7	0.3	1.0	0.0
Uncategorized/ROW	miles	0.0	0.7	0.6	0.0	0.0	0.0	0.0	0.0
Existing Subdivisions/Homeowners Associations	miles	0.3	0.7	0.5	0.3	3.7	1.9	0.9	1.3
Crossed (PWC)	(number)	4	8	3	3	13	11	8	5
Planned Developments Crossed	miles	1.6	0.2	0.4	2.5	1.4	0.5	1.2	0.8
	(number)	8	3	4	10	2	4	6	2
Proposed Commuter Rail stations Crossed	miles	0.3	<0.1	<0.1	0.3	0.1	<0.1	0.3	0.1
	(number)	(2)	(1)	(1)	(2)	(1)	(1)	(2)	(1)
Rural Crescent (PWC)	miles	0.2	0.0	0.0	0.4	15.8	0.9	0.2	4.6
Other Land Use Constraints									
Residences within 500 feet <sup>a</sup>									
Single Family Homes	number	82	128	114	99	149	254	47	50
Townhomes/Condos (structures)	number	4	86	109	4	0	33	28	0
Townhomes/Condos (units)	number	32	442	565	32	0	191	167	0
Apartment buildings	number	9	0	0	9	0	1	0	0
Residences within 200 feet <sup>d</sup>									
Single Family Homes	number	12	27	15	25	39	31	0	15
Townhomes/Condos (structures)	number	0	35	32	0	0	1	0	0
Townhomes/Condos (units)	number	0	165	151	0	0	6	0	0
Apartment buildings	number	2	0	0	2	0	1	0	0
Residences within 100 feet <sup>e</sup>									
Single Family Homes	number	2	13	5	3	6	0	0	2
Townhomes/Condos (structures)	number	0	21	17	0	0	0	0	0
Townhomes/Condos (units)	number	0	94	68	0	0	0	0	0
Apartment buildings	number	1	0	0	1	0	0	0	0
Buildings within Right-of-Way (total)	number	3	0	0	0	6	0	1	2



Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

TABLE 4-1 (cont'd)

Haymarket Substation and 230 kV Transmission Line Project Environmental Features Comparison Table									
Environmental Features	Unit	Carver Road Alternative	I-66 Hybrid Alternative	I-66 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative <sup>a</sup>
Residences	number	0	0	0	0	3	0	0	0
Industrial/Commercial	number	0	0	0	0	0	0	1	0
Outbuildings	number	3	0	0	0	3	0	0	2
Cemeteries within 500 feet	number	1	0	0	1	0	0	1	0
Churches within 500 feet	number	1	0	0	1	2	0	1	0
Schools within 500 feet	number	1	1	1	2	0	0	0	0
<b>Environmental Constraints</b>									
Wetlands Crossed in Right-of-Way (total)	miles	0.9	0.5	0.5	0.9	3.4	2.9	1.5	1.0
	(acres)	(11.5)	(5.1)	(5.9)	(11.3)	(36.9)	(34.8)	(20.8)	(11.5)
Palustrine Emergent	miles	0.2	0.1	0.1	0.2	0.8	1.1	0.1	0.2
	(acres)	(2.4)	(1.1)	(1.4)	(2.7)	(8.8)	(13.7)	(1.4)	(2.5)
Forested	miles	0.7	0.3	0.3	0.7	2.3	1.8	1.4	0.7
	(acres)	(8.3)	(3.6)	(3.9)	(7.8)	(24.5)	(21.1)	(18.9)	(8.4)
Palustrine Scrub Shrub	miles	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	(acres)	(0.0)	(0.0)	(0.0)	(0.0)	(2.4)	(0.0)	(0.0)	(0.0)
Palustrine Unconsolidated	miles	<0.1	<0.1	0.1	<0.1	0.1	0.0	<0.1	<0.1
	(acres)	(0.8)	(0.4)	(0.6)	(0.8)	(1.0)	(0.0)	(0.5)	(0.4)
Riverine/Open Water	miles	0.0	0.0	0.0	0.0	<0.1	0.0	0.0	<0.1
	(acres)	(0.0)	(0.0)	(0.0)	(0.0)	(0.2)	(0.0)	(0.0)	(0.2)
Waterbody Crossings (total)	number	8	5	5	9	36	26	10	10
Perennial	number	2	0	0	2	19	20	5	3
Intermittent	number	4	5	5	5	14	6	5	5
Section 10 Navigable	number	0	0	0	0	0	0	0	0
Open Waters	number	2	0	0	2	3	0	0	2
Forested Lands Crossed <sup>1</sup>	miles	3.8	2.7	2.8	5.0	11.0	4.1	2.8	4.7
	(acres)	(46.2)	(23.5)	(31.3)	(61.6)	(124.8)	(50.1)	(38.2)	(57.8)
VDOF High Forest Conservation Value 5	miles	0.0	0.0	0.0	0.0	0.9	<0.1	0.0	0.1
	(acres)	(0.0)	(0.0)	(0.0)	(0.0)	(10.7)	(0.4)	(0.0)	(0.7)
VDOF High Forest Conservation Value 4	miles	<0.1	0.0	0.0	<0.1	1.3	0.0	0.1	0.6
	(acres)	(0.3)	(0.1)	(0.1)	(0.3)	(15.3)	(0.2)	(1.2)	(7.2)
Resource Protection Areas Crossed (PWC)	miles	0.6	0.0	0.0	0.8	2.8	2.2	0.9	0.9
	(acres)	(6.7)	(0.0)	(0.0)	(9.4)	(31.7)	(25.8)	(13.1)	(10.9)
Conservation Easements Crossed									

Haymarket Substation and 230 kV Transmission Line Project  
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TABLE 4-1 (cont'd)

Haymarket Substation and 230 kV Transmission Line Project Environmental Features Comparison Table									
Environmental Features	Unit	Carver Road Alternative	I-86 Hybrid Alternative	I-86 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative <sup>a</sup>
Permanently Protected Open Space (PWC)	miles (number)	0.0 (0)	0.2 (2)	0.1 (1)	0.0 (0)	0.7 (3)	3.1 (6)	0.8 <sup>a</sup> (1)	0.1 (1)
Fauquier County Non-Common Open Space Easements	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
VDCR Conservation Lands	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.9 (1)	0.0 (0)	0.0 (0)
Northern Virginia Conservation Trust	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.6 <sup>b</sup> (1)	0.5 (1)	0.0 (0)	0.0 (0)	0.4 (1)
<b>Cultural Resources Constraints</b>									
Archaeology (VDHR )									
Archaeological Sites Within Right-of-Way	number	3	2	3	2	6	5	3	1
Architectural Resources (VDHR)									
Architectural Resources Within Right-of-Way (Battlefields listed below)	number	0	0	0	2	4	0	1	3
National Register-Eligible and -Listed Properties, Battlefields, Historic Landscapes, and National Historic Landmarks within 0.5 mile <sup>c</sup>	number	11	11	11	9	14	8	12	11
National Register-Listed Properties, Battlefields, Historic Landscapes, and National Historic Landmarks between 0.5 and 1.0 mile <sup>c</sup>	number	5	5	5	7	10	7	5	9
National Historic Landmarks between 1.0 and 1.5 miles	number	0	0	0	0	0	0	0	0
Historic Districts (VDHR) Crossed	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.5 (1)	0.0 (0)	0.0 (0)	0.4 (1)
NRHP-Listed Battlefield (VDHR) Crossed	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
NRHP-Eligible Battlefield (VDHR) Crossed	miles (number)	2.9 (2)	2.0 (2)	1.9 (2)	3.6 (2)	9.1 (2)	1.7 (2)	2.9 (2)	6.7 (2)
Easements (VDHR) Crossed	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Historic High Sensitivity Areas (PWC only)	miles (number)	0.4 (1)	0.3 (1)	0.0 (0)	0.4 (1)	0.0 (0)	0.0 (0)	0.9 (3)	0.0 (0)
Prehistoric Sensitivity Areas (PWC only)	miles (number)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.4 (0)	0.0 (0)	0.0 (0)	0.0 (0)

Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

TABLE 4-1 (cont'd)

TABLE 4-1 (cont'd)									
Haymarket Substation and 230 kV Transmission Line Project									
Environmental Features Comparison Table									
Environmental Features	Unit	Carver Road Alternative	I-66 Hybrid Alternative	I-66 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative*
	(number)	(0)	(0)	(0)	(0)	(2)	(0)	(0)	(0)
Battlefields (NPS ABPP)									
Core Areas Crossed	miles	0.5	0.4	0.4	0.5	2.5	0.2	0.7	2.1
	(number)	(2)	(2)	(2)	(2)	(1)	(2)	(2)	(1)
Study Areas Crossed	miles	4.2	3.3	3.1	4.9	6.6	3.0	4.2	5.2
	(number)	(4)	(4)	(4)	(4)	(3)	(4)	(4)	(3)
Potential NRHP Boundary Crossed	miles	1.7	1.1	1.0	2.5	6.4	1.9	1.6	5.2
	(number)	(3)	(3)	(3)	(3)	(2)	(3)	(3)	(2)
NRHP-Listed Boundary Crossed	miles	0	0	0	0	0	0	0	0
	(number)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Geological or Physical Constraints									
Mines or Mining Areas Crossed	miles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Visual Features/Constraints									
Length Parallel to Scenic Byway/Road	miles	0.7	0.6	0.6	2.1	2.4	0.4	0.7	1.4
Engineering Constraints									
Total Length	miles	6.7	5.3	5.0	8.2	21.2	6.1	5.7	8.6
Prince William County	miles	6.7	4.3	4.1	8.2	17.4	6.1	5.5	5.4
Fauquier County	miles	0.0	0.0	0.0	0.0	3.2	0.0	0.0	3.2
Loudoun County	miles	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Town of Haymarket	miles	0.0	1.0	0.9	0.0	0.0	0.0	0.2	0.0
Roads Crossings (total)	number	25	25	20	28	25	18	22	9
U.S. or State Highways (including on/off ramps)	number	16	20	16	16	7	13	16	2
County or Local Roads	number	9	5	4	12	18	5	6	7
Length Within VDOT Limited Access Right-of-Way	miles	1.5	2.4	3.2	1.5	0.1	1.0	1.5	0.0
Railroad Crossings	number	2	0	0	2	3	0	2	1
Existing Electric Facilities Crossed	number	0	1	1	0	15	1	0	3
Routing Opportunities									
Collocation Opportunities (total)	miles	4.4	5.0	4.5	5.7	14.3	2.8	4.5	2.9
	(percent)	(66)	(94)	(90)	(70)	(67)	(46)	(80)	(34)
Railroad	miles	0.4	0.0	0.0	0.4	1.1	0.0	1.4	0.6
Road	miles	3.6	5.0	4.5	5.1	1.7	2.5	3.1	0.9
Pipeline	miles	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Electric Line	miles	0.3	0.0	0.0	0.2	5.9	0.3	0.0	0.9

# Haymarket Substation and 230 kV Transmission Line Project Environmental Routing Study

TABLE 4-1 (cont'd)

Haymarket Substation and 230 kV Transmission Line Project  
Environmental Features Comparison Table

Environmental Features	Unit	Carver Road Alternative	I-66 Hybrid Alternative	I-66 Overhead Alternative	Madison Alternative	New Road Alternative	Northern Alternative	Railroad Alternative	Wheeler Alternative <sup>a</sup>
Electric Line and Road	miles	0.0	0.0	0.0	0.0	5.4	0.0	0.0	0.3
Road and Railroad	miles	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Length of Greenfield Route Required	miles	2.3	0.3	0.5	2.5	6.9	3.3	1.2	5.7
<p><sup>a</sup> Impacts quantified for the Wheeler Alternative do not include impacts along the up to five miles of additional transmission line that would be required for the alternative to be electrically feasible. See section 2.1.8.</p> <p><sup>b</sup> This includes Virginia DOT right-of-way and may include state-, county-, and locally owned roads.</p> <p><sup>c</sup> Residences within 500 feet includes: Carver Road Alternative (82 houses and 140 multi-family units), I-66 Hybrid Alternative (128 houses and 442 multi-family units), I-66 Overhead Alternative (114 houses and 565 multi-family units), Madison Alternative (99 houses and 140 multi-family units), New Road Alternative (149 houses), Northern Alternative (254 houses and 311 multi-family units), Railroad Alternative (47 houses and 167 multi-family units), and Wheeler Alternative (50 houses).</p> <p><sup>d</sup> Residences within 200 feet includes: Carver Road Alternative (12 houses and 24 multi-family units), I-66 Hybrid Alternative (27 houses and 165 multi-family units), I-66 Overhead Alternative (15 houses and 151 multi-family units), Madison Alternative (25 houses and 24 multi-family units), New Road Alternative (39 houses), Northern Alternative (31 houses and 126 multi-family units), Railroad Alternative (none), and Wheeler Alternative (15 houses).</p> <p><sup>e</sup> Residences within 100 feet includes: Carver Road Alternative (2 houses and 12 multi-family units), I-66 Hybrid Alternative (13 houses and 94 multi-family units), I-66 Overhead Alternative (4 houses and 68 multi-family units), Madison Alternative (3 houses and 12 multi-family units), New Road Alternative (6 houses), Northern Alternative (none), Railroad Alternative (none), and Wheeler Alternative (2 houses).</p> <p><sup>f</sup> Based on aerial photograph review.</p> <p><sup>g</sup> The protected open space crossing length is 0.8 miles; 0.6 miles are new Prince William County open space easement.</p> <p><sup>h</sup> Crossing length is calculated based on right-of-way crossing, not centerline crossing.</p> <p><sup>i</sup> Historic districts and landscapes include a number of contributing and non-contributing resources. Unless a resource located within a historic district or landscape is individually recorded as NRHP-eligible or -listed, the resource was not counted in the constraints table.</p> <p><sup>j</sup> The crossing lengths represent the length of the route within a battlefield area, rather than the combined crossing lengths for each battlefield. This was done to avoid double counting in areas where the route crossed multiple battlefields in the same location.</p>									
<p>Note: All ROW acreages are based on the specifications below for each alternative:</p> <p>Carver Road – 100 feet wide from Gainesville to Haymarket.</p> <p>Interstate 66 Hybrid – 100 feet wide from Gainesville to Highway 29 Transition Station, then 50 feet wide underground thereafter.</p> <p>Interstate 66 Overhead – 100 feet wide from Gainesville to Haymarket.</p> <p>Madison – 100 feet wide from Gainesville to Haymarket.</p> <p>New Road – 100 feet wide from New Road to Haymarket to Wheeler. The in/out segment to Haymarket is 140 feet wide.</p> <p>Northern – 100 feet wide from Gainesville to Haymarket.</p> <p>Railroad – 100 feet wide from Gainesville to Highway 29, then 120 feet wide thereafter.</p> <p>Wheeler – 100 feet from Wheeler to Haymarket.</p>									

## 4.1 Land Use

### 4.1.1 Land Ownership

While the majority (70 percent) of lands crossed by the Carver Road Alternative Route are privately owned, about 2.0 miles (30 percent) consists of road rights-of-way, and less than 0.1 mile (<1 percent) are Prince William County dedicated roads. The right-of-way along the Carver Road Alternative Route is primarily forested (3.8 miles and 57 percent) and developed lands (2.8 miles and 42 percent). Other land uses that would be crossed by the Carver Road Alternative Route consist of about 0.1 mile (1 percent) of open land and less than 0.1 mile (<1 percent) of cropland. Development of this route would require the clearing of about 46.2 acres of trees.

The majority (49 percent each) of lands crossed by the I-66 Hybrid Alternative Route are privately owned and road rights-of-way. The remaining 0.1 mile (2 percent) consists of the Prince William County dedicated road. The right-of-way along the I-66 Hybrid Alternative Route is primarily developed (3.5 miles and 66 percent). Other land uses that would be crossed by the I-66 Hybrid Alternative Route consist of about 1.6 miles of forested land (30 percent), and 0.1 mile of open land and crop land (2 percent each). Development of this route would require the clearing of about 23.5 acres of trees.

The majority (62 percent) of lands crossed by the I-66 Overhead Alternative Route are road rights-of-way. About 1.8 miles (36 percent) consist of privately-owned land, and the remaining 0.1 mile (2 percent) consist of Prince William County dedicated roads. The right-of-way along the I-66 Overhead Alternative is primarily developed (3.4 miles and 68 percent). Other land uses that would be crossed by the I-66 Overhead Alternative Route consist of about 1.4 miles of forested land (28 percent), 0.2 mile of cropland (4 percent), and less than 0.1 mile of open land (less than 1 percent). Development of this route would require the clearing of about 31.3 acres of trees.

The majority (66 percent) of lands crossed by the Madison Alternative Route are privately owned. The remaining 2.8 miles (34 percent) consist of road rights-of-way. The right-of-way along the Madison Alternative Route is primarily forested (4.4 miles and 54 percent) and developed land (3.4 miles and 41 percent). Other land uses that would be crossed by the alternative include about 0.3 mile (4 percent) of cropland, and 0.1 mile (1 percent) of open land. Development of this route would require the clearing of about 61.6 acres of trees.

The majority (98 percent) of lands crossed by the New Road Alternative Route are privately owned. The remaining 0.5 mile (2 percent) consist of road rights-of-way and less than 0.1 mile (<0.1 percent) are lands owned by the Town of Manassas associated with Lake Manassas. The right-of-way along the New Road Alternative Route is primarily forested (9.6 mile 45 percent). Other land uses that would be crossed by the alternative consist of about 5.6 miles (26 percent) of cropland, 5.4 miles (26 percent) of developed land, 0.5 mile open land (2 percent), 0.1 mile of open water (<1 percent), and less than 0.1 mile of mine/quarry land (<1 percent). Development of this route would require the clearing of about 124.8 acres of trees.

The majority (67 percent) of lands crossed by the Northern Alternative Route are privately owned, about 1.1 mile (18 percent) consists of road crossings, and 0.9 mile (15 percent) are state owned lands associated with the Conway-Robinson Memorial State Forest. The right-of-way along the Northern Alternative Route is primarily forested (3.6 miles and 59 percent). Other land uses that would be crossed by the Northern Alternative Route consist of about 2.2 miles of

developed land (36 percent), and 0.3 mile of cropland (5 percent). Development of this route would require the clearing of about 50.1 acres of trees.

The majority (65 percent) of lands crossed by the Railroad Alternative Route are privately owned and about 2.0 miles (35 percent) consists of road crossings. The right-of-way along the Railroad Alternative Route is primarily forested (2.9 miles and 51 percent) and developed land (2.6 miles and 46 percent). Other land uses that would be crossed by the Railroad Alternative Route consist of about 0.1 mile of open land and cropland (3 percent total). Development of this route would require the clearing of about 38.2 acres of trees.

The majority (99 percent) of lands crossed by the Wheeler Alternative Route are privately owned. Less than 0.1 mile (<1 percent) are owned by the Town of Manassas and associated with Lake Manassas. The remaining 0.1 mile (1 percent) consist of road rights-of-way. The right-of-way along the Wheeler Alternative Route is primarily forested (4.1 mile 48 percent). Other land uses that would be crossed by the alternative consisted of about 2.2 miles (26 percent) of developed land, 2.0 miles (23 percent) of cropland, 0.3 mile (3 percent) of open land, and less than 0.1 mile of mine/quarry land. Development of this route would require the clearing of about 57.7 acres of trees.

#### **4.1.2 Recreation Areas**

The Northern Alternative Route would cross three recreation areas. Conway-Robinson Memorial State Forest would be crossed once by the Northern Alternative Route for a distance of approximately 0.9 mile. The route would cross the western edge of the forest. The main entrance to the forest is located along Lee Highway (U.S. 29) and access to the forest should not be impacted during construction, however, access to certain portions of the forest and trails may be limited.

The Heritage Hunt Golf and Country Club would be crossed three times by the Northern Alternative Route for a total distance of about 0.5 mile. While the alternative is located within the boundaries of the recreation area, no golf tees, fairways, or greens would be directly crossed by the project. The alternative would skirt the edges of two holes which may cause temporary closures during construction.

The Piedmont Club would be crossed once by the Northern Alternative Route for a distance of approximately 0.4 mile. While the alternative is located within the boundaries of the recreation area, it would be located over 200 feet from any golf greens and it is not expected that construction of the alternative would impact use of the recreation area.

The first portion of the New Road Alternative Route would cross one recreation area, the Elizabeth Nickens Park. The crossing would occur on the western side of the park and would be about 170 feet in crossing length. It is likely that the park could be spanned with no structures being located within the park. This portion of the park is forested and would need to be cleared for construction of the alternative.

All route alternatives would cross the Culpeper Loop of the Virginia Birding and Wildlife Trail in at least one location. Given the developed nature of the Project area and trail crossing locations the Project would have minimal aesthetic impacts to users of this driving trail. For more information on potential impacts on the Culpeper Loop of the Virginia Birding and Wildlife Trail (see Section 4.3). Additionally, all routes would cross U.S. 15/U.S. 29 which are designated as the Journey Through Hallowed Ground. This is also discussed in more detail in Section 4.3.

#### 4.1.3 Residential, Existing and Planned Developments

Houses are concentrated along the portion of the Carver Road Alternative Route located south of the Norfolk Southern Railroad. The route would cross four existing subdivisions for a total of 0.3 mile of crossing length. There are three outbuildings encroaching on the proposed right-of-way along this alternative. It is possible that some of the outbuildings will need to be relocated if this route were selected. There are about 82 single family homes, 9 apartment buildings, and 4 townhome/condo buildings (with a total of 32 units) located within 500 feet of the centerline; 12 single family homes and 2 apartment buildings located within 200 feet; and 2 single family homes and one apartment building located within 100 feet. The Carver Road Alternative would cross eight planned developments for a total of about 1.6 miles.

Houses are concentrated along the portion of the I-66 Hybrid Alternative Route where the route parallels the northern side of I-66. The route would cross eight existing subdivisions for a total of 0.7 mile of crossing length. There are no structures encroaching on the proposed right-of-way along this alternative route. There are about 128 single family homes and 86 townhome/condo buildings (with a total of 442 units) located within 500 feet of the centerline; 27 single family homes and 35 townhome/condo buildings (with a total of 165 units) located within 200 feet; and 13 single family homes and 21 townhome/condo buildings (with a total of 94 units) located within 100 feet. The I-66 Hybrid Alternative Route would cross three planned developments for a total of about 0.2 mile.

Houses are concentrated along the portion of the I-66 Overhead Alternative Route where the route parallels the northern side of I-66. The route would cross three existing subdivisions for a total of 0.5 mile of crossing length. There are no structures encroaching on the proposed right-of-way along this alternative route. There are about 114 single family homes and 109 townhome/condo buildings (with a total of 565 units) located within 500 feet of the centerline; 15 single family homes and 32 townhome/condo buildings (with a total of 151 units) located within 200 feet; and single family homes and 17 townhome/condo buildings (with a total of 68 units) located within 100 feet. The I-66 Overhead Alternative would cross four planned developments for a total of about 0.4 mile.

Houses are concentrated along the portion of the Madison Alternative Route south of the Norfolk Southern Railroad. The route would cross three existing subdivisions for a total of 0.3 mile. There are no structures encroaching on the proposed right-of-way along this alternative route. There are about 99 single family homes, 9 apartment buildings, and 4 townhome/condo buildings (with a total of 32 units) located within 500 feet of the centerline; 25 single family homes and 2 apartment buildings within 200 feet; and 3 single family homes and 1 apartment building located within 100 feet. The Madison Alternative Route would cross 10 planned developments for a total of about 2.5 miles.

Houses are scattered along the first portion of the New Road Alternative Route. The route would cross 13 existing subdivisions for a total crossing length of 3.7 miles. There are six buildings located within the proposed right-of-way that would likely need to be removed along this alternative. Of these six buildings, three are houses and three are outbuildings. There are about 149 single family homes located within 500 feet of the centerline, 39 single family homes located within 200 feet, and 6 located within 100 feet. There are no townhome/condo or apartment buildings located within 500 feet of the centerline of this alternative route. The New Road Alternative Route would cross two planned developments for a total crossing of about 1.4 miles.

Houses are concentrated along the portion of the Northern Alternative Route where the route heads north through the Conway-Robinson Memorial State Forest and where it parallels Little Bull Run. The route would cross 11 existing subdivisions for a total of 1.9 miles of crossing length. There are no buildings encroaching on the proposed right-of-way that would need to be removed along this alternative. There are about 254 single family homes, 1 apartment building, and 33 townhome/condo buildings (with a total of 191 units) located within 500 feet of the centerline; 31 single family homes, 1 apartment building, and one townhome/condo building (with a total of 6 units) located within 200 feet, and no residential buildings located within 100 feet. The Northern Alternative would cross four planned developments for a total of 0.5 mile.

Houses are concentrated along the portion of the Railroad Alternative Route where the route parallels the Norfolk Southern Railroad and North Fork Broad Run. The route would cross eight existing subdivisions for a total of 0.9 mile of crossing length. There are no buildings encroaching on the proposed right-of-way that would need to be removed along this alternative. There are approximately 47 single family homes and 28 townhome/condo buildings (with a total of 167 units) residences located within 500 feet of the centerline. There are no residential buildings within 200 feet of the centerline. The Railroad Alternative would cross six planned developments for a total of about 0.9 mile.

Houses are scattered along the Wheeler Alternative Route with clusters of denser development along John Marshall Highway (SR 55) and Beverley's Mill Road. The route would cross five existing subdivisions for a total of 1.3 mile of crossing length. There are two outbuildings encroaching on the proposed right-of-way that would likely need to be removed along this alternative. There are about 50 single family homes located within 500 feet of the centerline, 15 single family homes located within 200 feet, and 2 located within 100 feet. The Wheeler Alternative Route would cross two planned developments for a total of about 0.8 mile.

All of the proposed alternatives, with the exception of the New Road Alternative and Wheeler Alternative Routes, would cross the Cushing Road rezoning site which is planned for the future development of a package delivery/distribution facility. The proposed facility and associated parking lot would be located to the east of the existing Gainesville-Loudoun Line #124 and would not be affected by the proposed tie-in of these route alternatives.

All eight of the proposed alternatives would cross land associated with the Midwood planned development. As currently proposed, the planned customer development, substation, and all eight routes would be located in the area of planned development proposed for residential development. Dominion will continue to work with Prince William County as the Project progresses to work out conflicts between the developments. Midwood is still working on a rezoning application and, as the land is currently zoned for the Midwood development, would conflict with county zoning codes.

The Carver Road Alternative Route would also cross land associated with the Somerwood, Regency Somerset, Haymarket Landing, Hunter at Haymarket, Village Place at Gainesville, and Gardner Station/McGraw's Corner planned developments. These planned developments are in the early planning stages and Dominion will continue to work with Prince William County as the Project progresses to work out any potential conflicts if this route were selected.

The I-66 Hybrid Alternative and I-66 Overhead Alternative Routes would also cross land associated with the Market Center at Haymarket planned development. The alternatives would cross the eastern side of the planned development close to a major road right-of-way. The I-66



Overhead Alternative Route would also cross lands associated with the Heritage Hunt Sims Property. The alternative would cross the southern side of the planned development also close to a major road right-of-way. It is unlikely that the routes would significantly affect the proposed developments.

The Madison Alternative Route would cross land associated with the Somerwood, Regency Somerset, Dominion Hunt, Woodbourne, Villages of Piedmont II, Village Place at Gainesville, Gardner Station/McGraw's Corner and Hunter at Haymarket planned developments. The alternative would cross the Hunter at Haymarket development on the western edge very close to James Madison Highway (U.S. 15). Due to the close proximity of the route to the highway it is unlikely that the route would significantly affect this proposed development. Other projects are in the early planning stages and Dominion will continue to work with Prince William County as the Project progresses to work out any potential conflicts if this route were selected.

The New Road Alternative and the Wheeler Alternative Routes would also cross lands associated with the Villages of Piedmont II planned development. The alternative would cross the development on the northern edge along bordering the Southern Norfolk Railroad. Due to the close proximity of the route to the railroad it is unlikely that the route would significantly affect the proposed development.

The Northern Alternative Route would cross land associated with the Village at Heathcote and Haymarket Crossing planned developments. These projects are in the early planning stages and Dominion will continue to work with Prince William County as the Project progresses to work out any potential conflicts if this route were selected.

The Railroad Alternative Route would cross lands associated with the Haymarket Landing, Hunter at Haymarket, Gardner Station/McGraw's Corner and Village Place at Gainesville developments. The crossing of Village Place at Gainesville would be located along the southern edge of the property near the Norfolk Southern Railroad. Due to the close proximity to the edge of the property and existing infrastructure, it is unlikely that the route would significantly affect the proposed development.

All of the proposed alternatives, with the exception of the Wheeler Alternative, New Road Alternative, and Northern Alternative Routes, would cross the proposed Gainesville-Haymarket Railway Express commuter line. The proposed commuter line would be located within the existing Norfolk Southern Railway right-of-way. None of the routes are routed within this right-of-way and the railroad crossings would be spanned, therefore impacts on the proposed commuter line are not expected.

As shown on Figure 9 in Appendix C, all eight route alternatives and the proposed substation would be located in part within the Haymarket 2 commuter rail station site. As the proposed station is currently laid out, the substation would be located in an area where new roads would connect John Marshall Highway (SR 55) to the station parking lot. The Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes would run along the eastern portion of the station on the edge of the proposed parking lot and stormwater management area. The Northern Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, New Road Alternative, and Wheeler Alternative Routes would enter the northern portion of the station which is proposed to remain as green space.

#### **4.1.4 Zoning**

The Carver Road Alternative Route would cross the following zoning districts: agricultural (4.0 miles or 60 percent), industrial (0.8 miles or 12 percent), residential (0.7 mile or 10 percent), business/commercial (0.9 mile or 13 percent), PBD (0.2 mile or 3 percent), and PMD (0.1 mile or 2 percent).

The I-66 Hybrid Alternative Route would cross the following zoning districts: agricultural (2.8 miles or 53 percent), industrial (0.5 miles or 9 percent), business/commercial (0.7 mile or 13 percent), uncategorized/ROW (0.7 mile or 13 percent), residential (0.2 mile or 4 percent) PMD (0.2 mile or 4 percent), PMR (0.1 mile or 2 percent), and PBD (0.1 mile or 2 percent).

The I-66 Overhead Alternative Route would cross the following zoning districts: agricultural (3.3 miles or 66 percent), industrial (0.4 miles or 8 percent), business/commercial (0.2 mile or 4 percent), uncategorized/ROW (0.6 mile or 12 percent), PMD (0.3 mile or 6 percent), PMR (0.1 mile or 2 percent), PBD (0.1 mile and 2 percent), and residential (<0.1 mile and <1 percent).

The Madison Alternative Route would cross the following zoning districts: agricultural (6.0 miles or 73 percent), industrial (0.8 miles or 10 percent), business/commercial (1.0 miles or 12 percent), residential (0.1 mile or 1 percent), PMD (0.1 mile or 1 percent) and PBD (0.2 mile or 3 percent).

The New Road Alternative Route would cross the following zoning districts: agricultural (19.6 miles or 93 percent), PBD (0.9 mile or 4 percent), and residential (0.7 mile or 3 percent).

The Northern Alternative Route would cross the following zoning districts: agricultural (2.7 miles or 44 percent), PMR (2.2 mile or 36 percent), PBD (0.4 mile or 7 percent), PMD (0.4 mile of 7 percent), residential (0.2 mile or 3 percent), industrial (0.1 mile and 1.5 percent), and business/commercial (0.1 mile and 1.5 percent).

The Railroad Alternative Route would cross the following zoning districts: industrial 0.8 miles or 14 percent), agricultural (2.7 miles or 47 percent), residential (1.0 mile or 17 percent), conservation (0.2 mile or 4 percent), business/commercial (0.7 mile or 12 percent), PBD (0.2 mile or 4 percent), and PMD (0.1 mile or 2 percent).

The Wheeler Alternative Route would cross the following zoning districts: agricultural (8.1 miles or 94 percent) and PBD (0.5 mile or 6 percent).

Due to existing Virginia Code and zoning regulations in Fauquier County, Prince William County, Loudoun County, and the Town of Haymarket, and with successful re-zoning of the Midwood development area at the proposed Haymarket substation site, the construction and operation of the proposed facilities should not directly or indirectly affect zoning within the area of the proposed Project.

#### **4.1.5 Conservation Lands**

As shown in Table 4-1, the Carver Road Alternative would not cross any conservation lands. The I-66 Hybrid Alternative Route would cross 0.2 mile of conservation land while the I-66 Overhead Alternative Route would cross 0.1 mile. The Madison Alternative would cross 0.6 mile of conservation land associated with a privately-owned Northern Virginia Conservation

Trust easement. The centerline would not cross this easement, however, the right-of-way would extend into the easement. The New Road Alternative Route would cross 0.7 mile of conservation land, the Wheeler Alternative Route would cross 0.1 mile, the Northern Alternative Route would cross 3.1 miles, and the Railroad Alternative Route would cross 0.8 mile. All of these crossings are of Prince William County permanently protected open spaces, Northern Virginia Conservation Trust lands, and the new Somerset open space and trail easement along the Railroad Alternative Route. Dominion understands that properties are placed under easement throughout the year and additional easements may be identified as the Project moves forward. Dominion will continue to consult with the various land managing entities regarding potential new easements in the area of the proposed project.

#### **4.1.6 Transportation**

As noted in Table 4-1, the Madison Alternative would cross 28 roads. The Carver Road Alternative Route, New Road Alternative Route, and the I-66 Hybrid Alternative Route would all cross 25 roads, and the Railroad Alternative Route would cross 22 roads. I-66 Overhead Alternative Route would cross 20 roads, the Northern Alternative Route would cross 18 roads, and lastly the Wheeler Alternative Route would have the least number of road crossings at 9.

Interstate 66 is currently undergoing a widening project within the Project area. Construction started in April 2014 and is currently expected to be completed in August 2016. Additional consultation with the VDOT is underway to ensure that locations of towers would not interfere with the road widening project. All road crossings for the above ground routes would be spanned. The alternative routes would be located within the VDOT I-66 limited access right-of-way for varying distances. The I-66 Overhead Alternative Route has the longest length within this right-of-way at 3.2 miles and the I-66 Hybrid Alternative Route has the second longest crossed at 2.4 miles. The Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes are all within the right-of-way for 1.5 miles. The Northern Alternative is within the right-of-way for 1.0 mile, the New Road Alternative for just 0.1 mile, and the Wheeler Alternative does not cross the right-of-way.

#### **4.2 Environmental Constraints**

Crossing of wetland resources favors the I-66 Hybrid Alternative and the I-66 Overhead Alternative Routes over the other route options. The I-66 Hybrid Alternative Route crosses a total of 0.5 mile of wetlands (5.1 acres) while the I-66 Overhead Alternative Route also crosses a total of 0.5 mile of wetlands with a slightly higher (5.9 acres) area of impact. In contrast, the Carver Road Alternative Route crosses a total of 0.9 mile (11.5 acres) of wetlands, the Madison Alternative Route would cross 0.9 mile (11.3 acres) of wetlands, the Wheeler Alternative Route would cross 1.0 mile (11.5 acres) of wetlands, and the Railroad Alternative Route would cross 1.5 miles (20.8 acres) of wetlands. The Northern Alternative and the New Road Alternative Routes have the largest wetland impacts with 2.9 miles (34.8 acres) along the Northern Alternative Route and 3.4 miles (36.9 acres) along the New Road Alternative Route. Impacts to wetland resources along these routes would be greater to achieve adequate structure support in unconsolidated soils in saturated areas in addition to more tree clearing.

Waterbody crossings marginally favor the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes over the other alternatives. The I-66 alternatives would both cross five waterbodies. The Carver Road Alternative Route would cross 8 waterbodies, the Madison Alternative Route would cross 9, the Wheeler Alternative Route and the Railroad Alternative Route would both

cross 10 waterbodies. The Northern Alternative and the New Road Alternative Routes have the most waterbody crossings at 26 and 36 crossings respectively.

Crossing of forested lands favors the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes over the other six routes. The I-66 Hybrid Alternative Route would cross approximately 2.7 miles of forested land requiring about 23.5 acres of tree clearing while the I-66 Overhead Alternative Route would cross 2.8 miles of forested land requiring about 31.3 acres of tree clearing. The Railroad Alternative Route would cross 2.8 miles of forested land requiring about 38.2 acres of tree clearing and the Carver Road Alternative Route would cross 3.8 miles of forest requiring 46.2 acres of tree clearing. The Wheeler Alternative Route would cross 4.7 miles of forested land requiring about 57.8 acres of tree clearing and the Northern Alternative Route would cross 4.1 miles of forested land requiring 50.1 acres of tree clearing. The routes requiring the most tree clearing are the Madison Alternative and the New Road Alternative Routes. These routes cross 5.0 miles and 11.0 miles for forested land respectively and would require 61.6 and 124.8 acres of tree clearing.

Crossings of Resource Protection Areas, or RPAs, again favor the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes over the other alternatives.<sup>1</sup> These two alternatives would not cross any RPAs. As noted earlier, RPAs consist of tidal and non-tidal wetlands, tidal shorelines, and buffer zones of 100 feet wide along perennial waterways. The Carver Road Alternative Route would cross 0.6 mile (6.7 acres) of RPAs and the Madison Alternative Route would cross 0.8 mile (9.4 acres) of RPAs. The Railroad Alternative Route would cross 0.9 mile (13.1 acres) of RPAs and the Wheeler Alternative would cross 0.9 mile (10.9 acres) of RPAs. The routes with the greatest impact to RPAs are the Northern Alternative and the New Road Alternative Routes. These routes would cross 2.2 miles (25.8 acres) and 2.8 miles (31.7 acres) of RPAs respectively.

Regarding impacts to protected species, the VDCR determined that, due to the scope of the activity and distance to resources, the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, and Railroad Alternative Routes would not impact natural heritage resources. In addition, the VDCR stated that the Northern Alternative Route would not impact known natural heritage resources, however, the portion intersecting the Conway-Robinson Memorial State Forest is currently under review by VDCR ecologists to determine whether or not unidentified natural heritage resources are present in the area. The New Road Alternative Route crosses the Bull Run – Chestnut Lick SCU at multiple locations, and intersects upstream waters of the Catharpin Creek above Route 676 SCU and Silver Lake Conservation Site. Although there were no documented state- or federal-listed species occurrences along the routes, the FWS determined that the project area may support potential habitat for northern long-eared bat, dwarf wedgemussel, and harperella. The FWS determined that species surveys will be required prior to construction to determine if the potential presence for listed species or suitable listed species habitat exists.

#### **4.3 Visual Constraints**

One landform composes the landscape crossed by the eight routes: the Piedmont Plateau. The Piedmont Plateau is a rolling to locally hilly landscape underlain by metamorphic and igneous

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<sup>1</sup> Although SCC-approved electric transmission lines are exempt from restrictions in RPAs, these features were considered constraints in this study given the potential for new facilities to impact sensitive features in these areas (e.g., riparian vegetation or wetlands).

rocks. The Culpeper basin, a north-northeast trending remnant of an ancient rift valley now filled with sediments eroded off of the Appalachian Mountains, is a nearly level landform located within the Piedmont Plateau (Johnson and Froelich, 1982). The study area is located within the Culpeper basin. The vegetation in the study area has been altered by a long history of logging, agriculture, and other anthropogenic disturbances leaving a patchwork of residential, commercial and industrial development interspersed with secondary forests, pasture, and fields.

To assess the potential for the Project to affect viewsheds or visually sensitive features associated with each route, aerial photographs were reviewed and specific viewer groups were considered, including motorists; recreationalists; and residents; however, visual simulations and/or line-of-sight cross-sections were not prepared for each route. A field investigation was undertaken to assess possible visual impacts on cultural resources for each route. Visually-sensitive resources include: the Journey Through Hallowed Ground NHA; scenic byways; resources listed in or eligible for listing in the NRHP; recreational; and natural areas.

The study area is encompassed within the Journey Through Hallowed Ground NHA. The NHA Management Plan identifies priorities related to the conservation of historic site setting and lands that form the setting for the most scenic views associated with the Journey Through Hallowed Ground (JTHG Partnership, 2014). A viewshed analysis was completed along the scenic byway (James Madison Highway [U.S. 15]) by the JTHG Partnership to assist with conservation efforts. One "anchor site,"<sup>2</sup> the Manassas National Battlefield Park, was identified as part of the JTHG analysis and is located within the study area; however, none of the alternatives would likely introduce new visual elements into this property's viewshed. Along the Madison Alternative, Railroad Alternative, Northern Alternative, and I-66 Overhead and Hybrid Alternative Routes, existing transmission lines and a substation are highly visible from the Manassas National Battlefield Park. Given the developed nature of this area the routes are unlikely to impact the visual environment of the park.

Of the 29 historic and architectural sites that are eligible for listing or are listed in the NRHP within the study area, Buckland Mills Battlefield (030-5152) and Thoroughfare Historic District (076- 5150) could be adversely impacted by the Wheeler Alternative and New Road Alternative Routes. The New Road Alternative and Wheeler Alternative Routes cross the rural core area of the Buckland Mills Battlefield. It is likely that the construction and operation of the New Road Alternative, Wheeler Alternative or Northern Alternative Routes could alter the setting, a character-defining feature, of the battlefield. The poles and transmission lines could increase intrusion into what is a relatively unspoiled viewshed.

Both the New Road Alternative and Wheeler Alternative Routes cross or are in close proximity to the Thoroughfare Historic District. Additionally, both routes cross the Primas Cemetery. It is likely that the construction and operation of the New Road Alternative or Wheeler Alternative Routes would alter the setting, a character-defining feature, of the historic district. The poles and transmission lines could increase intrusion into what is a relatively unspoiled viewshed.

The Culpeper Loop of the Virginia Birding and Wildlife Trail (Figure 5) is a driving trail that offers access to multiple public bird viewing areas. The trail follows I-66, U.S. 29, U.S. 15, and State Highways 55 and 215. The eight routes intersect the trail at these road crossings. Views of

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<sup>2</sup> An anchor site is defined as having national or state significance, is related to one or more of the JTHG themes, and is accessible to the public. Anchor sites are expected to be tourist destination points for the broadest range of travelers.

motorists traveling on these highways would be affected where the routes intersect the highways for relatively brief durations. Additionally, motorists would have a relatively narrow field of view along the roadway. Drivers on these major roads would be focus on road and traffic conditions and would likely have limited opportunity to observe roadside scenery. Passenger in moving vehicles may have greater opportunity to off-road views, but the speed of travel would limit birding opportunities. Therefore, viewer sensitivity would be considered low along the trail.

The Northern Alternative crosses about 0.9 mile of the western edge of the Conway-Robinson Memorial State Forest, located just north of Lee Highway (U.S. 29). The forest is a day use area with trails (hiking, biking, and horseback riding) and a picnic shelter (Virginia Department of Forestry, 2014). One recreational trail north of an old railroad bed and east of Derby Run Way would likely be crossed by and run parallel to the Northern Alternative Route. The duration of the views of the recreationalists along the trail could range from a few to several minutes. Therefore, the viewshed impact by the Northern Alternative Route may be moderate to high within the forest particularly where the route crosses the recreational trail. Where the route runs parallel to the trail, the forest may create a vegetation screen for the recreationalist.

The Northern Alternative Route crosses the Heritage Hunt Golf and Country Club for about 0.5 mile. The recreationalists generally have a relatively high sensitivity to the character of the landscape and will often have continuous views of the landscape. The existing scenery at the golf course is residential and the viewshed is open. The route may represent a visual intrusion into the recreational setting.

The Rural Crescent is crossed by the New Road Alternative and Wheeler Alternative Routes for 15.8 and 4.6 miles, respectively. It is also crossed by the Northern Alternative, Madison Alternative, Railroad Alternative, and Carver Road Alternative Routes for shorter distances (see Table 4-1). The landscape is dominated by woodland, open space, agriculture, and other undeveloped land. Residents' sensitivity to visual quality is often tempered by the character of the neighborhood. The Rural Crescent is not densely populated and the residents may have greater sensitivity to changes in their viewshed. The two routes may not be compatible with the rural character of the area and may represent a visual intrusion into the rural landscape.

#### **4.4 Cultural Resources Constraints**

Crossings of, or in proximity to, known archaeological sites favor the Wheeler Alternative Route, which crosses a single archaeological site (44PW1948) determined not eligible for listing in the NRHP, and is within 20 feet of the unevaluated Site 44PW1950.

The I-66 Hybrid Alternative Route and Madison Alternative Route rights-of-way each cross two archaeological sites, while the Carver Road Alternative Route, I-66 Overhead Alternative Route, and Railroad Alternative Route rights-of-way cross three archaeological sites. The Madison Alternative Route right-of-way is also within 10 feet of the unevaluated Site 44PW1852. Of the two archaeological sites crossed by the I-66 Hybrid Alternative Route, one has been determined not eligible for listing in the NRHP (44PW0986) and the other is unevaluated (44PW1121), but has likely been disturbed during construction of residential development. The I-66 Overhead Alternative Route also crosses Sites 445PW0986 and 44PW1121 in addition to Site 44PW0985, which is not eligible for listing in the NRHP. The two sites (44PW1498 and 44PW1963) crossed by the Madison Alternative Route right-of-way are both unevaluated. Both the Carver Road Alternative and Railroad Alternative routes cross the unevaluated Sites 44PW1853 and

44PW1854. The Carver Road Alternative also crosses Site 44PW1636, which has been determined not eligible, while the Railroad Alternative crosses the unevaluated Site 44PW0893.

The Northern Alternative and the New Road Alternative Routes cross or are in proximity to the largest number of archaeological sites. The New Road Alternative Route crosses six archaeological sites and is within approximately 10 feet of an unevaluated historic dwelling (44PW1950). The Northern Alternative Route crosses five archaeological sites and is within five feet of an unevaluated prehistoric site (44PW1932). Two of the sites crossed by the New Road Alternative Route right-of-way (44PW1727 and 44PW1948) are not eligible for listing in the NRHP, while the remaining four sites (44LD0350, 44LD0489, 44PW0367, and 44PW1254) are unevaluated. Four of the five unevaluated archaeological sites crossed by the Northern Alternative Route (44PW1945, 44PW1944, 44PW1937, and 44PW1936) are located within Conway-Robinson Memorial State Forest; the remaining site (44PW1839) is located near the proposed Haymarket Substation.

Each route crosses the Journey-Through Hallowed Ground NHA, which was established by the Consolidated Natural Resources Act of 2008 (Public Law 110-229). The NPS (2015) defines NHAs as congressionally-designated places where natural and cultural resources form a cohesive landscape of national importance. In Virginia, the Journey Through Hallowed Ground NHA crosses about 75 miles and nine counties, including Prince William, Fauquier, and Loudoun Counties. Several scenic, natural, recreational, and historic places are featured along the NHA near U.S. Route 15 and State Route 20. The project review area includes, military landscapes, cultural resources, and historic properties that fall within the NHA (Table 3.4.2-1) impacts on these resources are addressed in D+A's viewshed analysis and are discussed below.

With regard to historic architectural sites, crossings of these resources favor the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, and Northern Alternative Routes given no architectural sites are located within the rights-of-way of these alternatives. The Railroad Alternative Route right-of-way crosses one unevaluated architectural property (North Fork Steel Truss Bridge [076-0150]), while the Madison Alternative Route crosses two unevaluated architectural properties (076-0463 and 076-5669). Both the New Road Alternative Route and Wheeler Alternative Route rights-of-way cross 0.5 and 0.4 mile, respectively, of the NRHP-eligible Thoroughfare Historic District. Additionally, the New Road Alternative Route and Wheeler Alternative Route rights-of-way cross the unevaluated House, John Marshall Hwy (076-5668) and the unevaluated Primas Cemetery (076-5140), which is located within the Thoroughfare Historic District. Additionally, the New Road Alternative Route right-of-way crosses the unevaluated Old Log House (076-0060).

The I-66 Hybrid, I-66 Overhead, and Railroad Alternative Routes each cross a single locally-designated historic district: The Old and Historic Town of Haymarket. The Old and Historic Town of Haymarket was adopted by the Haymarket Town Council in 1994 when the council placed the area within the corporate limits of the Town of Haymarket under a Historic District Zoning Ordinance (Town of Haymarket, 2014). The historic overlay district was established to provide protection specific to the town's historic resources. A portion of the Old and Historic Town of Haymarket (Haymarket Historic District [233-5002]) was assessed for NRHP eligibility; however, the VDHR determined the district was not eligible for listing in the NRHP in 2004. Crossing lengths for the Old and Historic Town of Haymarket overlay district are comparable for the I-66 Hybrid and I-66 Overhead Alternative Routes, with crossing lengths of 1.0 mile and 0.9 mile respectively; however, the portion of the I-66 Hybrid Alternative Route crossing the

historic overlay district would be underground. The Railroad Alternative Route crosses the shortest distance of the Old and Historic Town of Haymarket at 0.2 mile.

Each route crosses the study areas of the Manassas Station Operations Battlefield (076-5036), Buckland Mills Battlefield (030-5152), and Thoroughfare Gap Battlefield (030-5610), while all but the New Road Alternative and Wheeler Alternative Routes cross the study areas of the Second Battle of Manassas (076-5190). Both the core area boundaries for Buckland Mills Battlefield and potential NRHP boundaries for Buckland Mills Battlefield and Thoroughfare Gap Battlefield are crossed by each route, while the core area potential NRHP boundaries for Second Battle of Manassas are crossed by all but the New Road Alternative and Wheeler Alternative Routes. Both the Manassas Station Operations Battlefield and Buckland Mills Battlefield are eligible for listing in the NHRP, while the Second Battle of Manassas is unevaluated. A small portion of the Thoroughfare Gap Battlefield is listed in the NRHP and VLR (030-1016); however, the extent of the battlefield (030-5610) as delineated by the ABPP, which includes the NRHP-listed core area as well as the study area and potential NRHP boundary, is unevaluated.

The total crossing lengths for all four battlefields range from 3.0 miles for the Northern Alternative to 6.6 miles for the New Road Alternative. The battlefield crossing lengths along the Northern Alternative, I-66 Overhead Alternative and the I-66 Hybrid Alternative Routes are comparable and the shortest at 3.0, 3.1, and 3.3 miles, respectively; however, the I-66 Hybrid Alternative Route and the I-66 Overhead Alternative Route cross the shortest distance of potential NRHP boundaries at 1.1 and 1.0 mile, respectively. Additionally, effects to the viewshed for these battlefields will likely be limited for the I-66 Hybrid Alternative Route given approximately 3.1 miles of the route are underground. Approximately 1.9 miles of potential NRHP boundaries are crossed by the Northern Alternative Route. The battlefield crossing lengths along the Carver Road Alternative and Railroad Alternative Routes are comparable at 4.2 miles, of which 1.6 miles of the Railroad Alternative Route and 1.7 miles of the Carver Road Alternative Route cross potential NRHP boundaries. The battlefield crossing lengths are greatest along the Madison Alternative, Wheeler Alternative, and New Road Alternative Route at 4.9, 5.2, and 6.6 miles, respectively; however, the Madison Alternative Route crosses the shortest length of potential NRHP boundaries at 2.5 miles. The Wheeler Alternative Route crosses 5.2 miles of potential NRHP boundaries, while 6.4 miles of the New Road Alternative Route fall within potential NRHP boundaries. Battlefield core area crossing lengths along the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes are comparable, with crossing lengths ranging from 0.2 mile along the Northern Alternative Route to 0.7 mile along the Railroad Alternative Route. The Wheeler Alternative Route crosses 2.1 miles of the Buckland Mills Battlefield core area, while the New Road Alternative Route has the greatest battlefield core area crossing length of 2.5 miles.

The Manassas Station Operations Battlefield (076-5036), Buckland Mills Battlefield (030-5152), Thoroughfare Gap Battlefield (030-5610), and the Second Battle of Manassas (076-5190) are also located within 0.5 and 1.0 mile of each route alternative. These tiers were considered with regard to potential impacts on viewsheds.

The Manassas Station Operations Battlefield study area is crossed by the eight route alternatives on the south side of I-66, however these routes are over 5.0 miles from the core area of the battlefield and potentially eligible NRHP boundaries. The study area between Haymarket and Gainesville is characterized by dense residential and commercial development, while the study area along John Marshall Highway (SR 55) between Beverly Road and James Madison Highway (U.S. 15) remains relatively undeveloped. Given the core area or potential NRHP portions of the battlefield are well beyond the tiered study areas for the eight route



alternatives, it is recommended that there may be no impact on Manassas Station Operations Battlefield.

The Buckland Mills Battlefield study area is crossed by the eight route alternatives. Both the Carver Road Alternative and Madison Alternative Routes cross 0.5 mile of core area, while Carver Road Alternative Route crosses 1.1 miles and Madison Alternative Route crosses 1.9 miles of potential NRHP boundaries. Both the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes cross about 0.4 mile of core area and 0.2 mile of potential NRHP boundaries; however, the portion of core and potential NRHP areas crossed by the I-66 Hybrid Alternative Route will be underground. The Railroad Alternative Route crosses 0.6 mile of core area and 1.0 mile of potential NRHP area. The Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, and Railroad Alternative Routes cross the northeastern portion of the battlefield, which as a whole is largely characterized by transmission lines, commercial and industrial development, and new roads. Due to the modern development, these routes may not wholly be introducing new visual elements into the viewshed. Therefore it is recommended that these four routes may have minimal to no impact on the Buckland Mills Battlefield. The Northern Alternative Route crosses 1.2 miles of potential NRHP area and extends across 0.1 mile of one of the four core areas of the battlefield. The Northern Alternative Route crosses the northeastern portion of the battlefield, which as a whole is largely characterized by transmission lines, commercial and industrial development, and new roads. Despite the existing modern development, the Northern Alternative Route may introduce new visual elements to the viewshed; it is recommended that the Northern Alternative Route may have a moderate impact on the Buckland Mills Battlefield. The region of the battlefield through which the New Road Alternative and Wheeler Alternative Routes extend remains relatively undeveloped in comparison to the portions of the battlefield along Lee Highway (U.S. 29) and James Madison Highway (U.S. 15). Potential NRHP boundaries are crossed by 6.3 miles of the New Road Alternative Route and 5.2 miles of the Wheeler Alternative Route. The New Road Alternative and Wheeler Alternative Routes extend through two of four defined cores areas, for a total of 2.5 miles and 2.1 miles, respectively. The larger core area along Lee Highway (U.S. 29) near Buckland Historic District has witnessed little development, while the smaller core area along John Marshall Highway (SR 55) just west of James Madison Highway (U.S. 15) is already characterized by transmission lines, commercial and industrial development, and new roads. The New Road Alternative and Wheeler Alternative Routes may be a clearly visible intrusion through much of the relatively rural battlefield core area and could introduce new visual elements into the viewshed. It is recommended that the New Road and Wheeler Alternative Routes may have a severe impact on the Buckland Mills Battlefield.

Thoroughfare Gap Battlefield study area and potential NRHP boundaries are crossed by the eight route alternatives along John Marshall Highway (SR 55) towards Haymarket. The New Road Alternative Route also crosses the battlefield study area again at Waterfall Road. The Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes cross a small portion of the battlefield at the southeast tip near the Haymarket Substation. While this area has been identified as potentially NRHP-eligible by the ABPP, heavy commercial development has begun to encroach upon the area near the intersection of John Marshall Highway (SR 55) and James Madison Highway (U.S. 15). The Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes are over two miles from the core area and NRHP-listed boundaries of the battlefield (030-1016) and given the distance and existing vegetation the towers would not be visible from much of the battlefield. With the exception of the I-66 Hybrid Alternative Route, which will be underground in this area, each of the routes may be visible from portions of the battlefield near

John Marshall Highway (SR 55) and James Madison Highway (U.S. 15). This area's setting is no longer intact and it is recommended that these routes may have minimal to no impact on Thoroughfare Gap Battlefield. The New Road Alternative and Wheeler Alternative Routes cross a larger portion of the potential NRHP boundaries (2.7 miles and 1.6 miles, respectively) and study area boundaries (2.9 miles and 1.6 miles, respectively) and are approximately 0.5 mile from the battlefield core area and 1.1 miles from the NRHP-listed boundaries. While existing transmission lines parallel Route 55, only a small amount development has taken place along John Marshall Highway (SR 55); it is recommended that the New Road Alternative and Wheeler Alternative Routes may have a moderate impact on Thoroughfare Gap Battlefield.

With the exception of the New Road Alternative and Wheeler Alternative Routes, each route crosses the Second Battle of Manassas study area just north of Lee Highway (U.S. 29). This area has been described by the NPS as "altered and fragmented" and is not considered potentially eligible for the NRHP. This portion of the battlefield is dominated by existing transmission lines and commercial, residential, and industrial development. Approximately 0.6 mile of the eastern terminus of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, and Railroad Alternative Routes and 0.7 mile of the eastern terminus of the Northern Alternative Route is located within the potential NRHP boundaries. The eastern end of these five route alternatives parallel the north side of I-66 and the southwest border of the potential NRHP boundary, which is largely undeveloped. Approximately 0.1 mile of the eastern terminus of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative and Railroad Alternative Routes are located within the core area of the battlefield although there are no characteristic differences between this area and the area outside the battlefield core area north of Lee Highway (U.S. 29). Regardless of the route, the proposed transmission line could be visible from portions of the potential NRHP battlefield as it extends along an undeveloped area and would be out of character within the existing veiwscaps, therefore it is recommended there may be a moderate impact on the Second Battle of Manassas.

A single NRHP- and VLR-listed historic district and Prince William County Registered Historic Site (Manassas National Battlefield Park Historic District [076-0271]) is located within the 0.5-mile and 1.0-mile buffers of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes. The New Road Alternative and Wheeler Alternative Routes are within 0.5-mile of two NRHP-eligible historic districts (Vint Hill Farms Station Historic District [030-0020] and Thoroughfare Historic District [076-5150]), and within 0.5- and 1.0-mile of the NRHP- and VLR-listed Buckland Historic District and Expansion (076-0313). Buckland Historic District and Expansion is also located with 1.0-mile buffer of the Madison Alternative Route.

Regarding the Manassas National Battlefield Park Historic District (Park), a NRHP-listed property, the NPS previously conducted a study that identified viewshed anchors within the Park, of which four such anchors are located within 1.6 miles of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes, including the W. Lewis House, Stuart's Hill, Battery Heights, and Brawner's House, which are depicted in D+A's report included as Appendix C. The W. Lewis House is located 0.7 mile northeast of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes and is along the southern portion of the Park within a field. The southern boundary of the park is lined with trees obscuring views of I-66. Stuart's Hill, is located 0.6 mile north of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative and Railroad Alternative Routes, just south of Route 29 and east of an existing ROW. Views from Stuart's Hill are visible towards the north

overlooking the hill, views south are not visible as from the bottom of the hill only the hill is visible, and at the top of the hill views are directly into the forest. Brawner's Farm is located 1.2 miles north of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative and Railroad Alternative Routes. Existing transmission lines and a substation are already highly visible when facing south. Battery Heights is located about 1.2 miles northeast of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative and Railroad Alternative Routes and primary views face north and east towards rolling hills.

Land outside of the historic district boundaries has been described by the NPS (2009) as "fragmented and altered" and that it will most likely fade within the next five years due to ongoing development. Although once rural in setting, the area outside of the battlefield boundaries is now dominated by existing transmission lines. For many areas of the Park, the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes will not be visible. It is proposed that no new elements will be introduced to the views and that the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Northern Alternative, and Railroad Alternative Routes may have only a minimal impact on the Manassas National Battlefield Park Historic District.

Vint Hill Farms Station Historic District is a complex mixture of nineteenth and twentieth century buildings. The buildings and setting of the historic district have been heavily altered. The buildings associated with the district are nearly 1.0 mile to the southwest of the New Road Alternative and Wheeler Alternative Routes. The views toward the New Road Alternative and Wheeler Alternative Routes are already obscured by intervening topography, vegetation, and development; therefore it is recommended that these routes may have no impact on the Vint Hill Farms Station Historic District.

Thoroughfare Historic District includes nine resources, including the Southern Railway Depot at Thoroughfare and Primas Cemetery. The historic district remains relatively rural with agricultural fields and forests south of John Marshall Highway (SR 55) and dwellings and small businesses flanking the street. While utility lines parallel the streets and I-66 bisects the district, these do not detract from the character of the district. Given the historic district has seen little modern change, that both the New Road Alternative and Wheeler Alternative Routes extend through and parallel the historic district, and both routes are in close proximity to Primas Cemetery it is recommended that both alternatives may have a severe impact on the Thoroughfare Historic District.

Buckland Historic District and Expansion is a complexly drawn district. The boundaries were enlarged in 2007 to include the plotted town and street grid, town common lands, the mill race and dam, plantations surrounding the town - including Buckland Hall, portions of the Buckland Mills Battlefield, and much of the historic viewshed. Views of the Madison Alternative Route, New Road Alternative Route, and Wheeler Alternative Route rights-of-way from the district are protected by the rolling topography and mature trees. It is recommended that these routes may have minimal impact on the Buckland Historic District and Expansion.

In addition to the historic districts and battlefields, there are six NRHP- and VLR-listed and nine NRHP-eligible architectural properties that are within 0.5 mile and/or 1.0 mile of one or more of the Project components.

The NRHP-listed St. Paul's Episcopal Church (233-0002) and the Old Town Hall and School (233-0006) are within the 0.5-mile buffer of the Carver Road Alternative, I-66 Hybrid Alternative,

I-66 Overhead Alternative, Madison Alternative, and Railroad Alternative Routes, and within the 1.0-mile buffer of the Northern Alternative, New Road Alternative, and Wheeler Alternative Routes. The Old Town Hall and School is within the 0.5-mile buffer of the Northern Alternative and 1.0-mile buffer of the Madison Alternative Routes. The historic setting for both resources has been diminished by the increase in modern development. Views by each of the eight routes may largely be obscured by the intervening development and existing vegetation, therefore, it is recommended that the proposed routes may have minimal to no impact on St. Paul's Episcopal Church and the Old Town Hall and School.

The NRHP-listed Greenwich Presbyterian Church & Cemetery (076-0175) is located 0.3 mile and the NRHP-listed The Lawn (076-0178) is located 0.4 mile north of the New Road Alternative and Wheeler Alternative Routes. The towers for both routes may largely be obscured by distance and existing vegetation. It is recommended that the New Road Alternative and Wheeler Alternative Routes may have minimal impacts on Greenwich Presbyterian Church & Cemetery and The Lawn.

The NRHP-listed Mount Atlas (076-0015) is located about 0.3 mile north and the NRHP-listed Locust Bottom (076-0088) is 0.75 mile west of the New Road Alternative Route. Mount Atlas is situated on 8.2 acres surrounded by modern single family dwellings. The historic setting is no longer intact as the property has been subdivided and the outbuildings associated with the main dwelling, which is vacant and deteriorating, have been demolished. Views of the route are largely shielded by mature trees and houses. Locust Bottom, a large livestock farm, has been in continual use and the main house survives relatively unaltered. Given views of the route are largely shielded by distance, topography and vegetation, it is recommended that the New Road Alternative Route may have no impact on either Locust Bottom or Mount Atlas.

The NRHP-eligible Haymarket Post Office (233-0005) and Winterham (233-0008) are within the 0.5-mile buffer of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Northern Alternative, and Railroad Alternative Routes. Winterham is also within the 0.5-mile buffer of the Madison Alternative Route. The Haymarket Post Office is a two-story building that has been used primarily as a commercial space, though the second floor has been used as housing. The building itself is in good condition, but the historic setting has been diminished by the extent of modern development. Winterham is a late nineteenth century dwelling. The original outbuildings have been demolished and the property is surrounded by a parking lot. The VDHR has acknowledged the area surrounding Winterham lacks historic integrity given the extent of modern development in the area. Views from the Haymarket Post Office and Winterham towards the routes are obscured by existing development and vegetation, though the I-66 Hybrid Alternative Route will not be visible since the route will be underground. It is recommended that the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Northern Alternative, and Railroad Alternative Routes may have minimal to no impact on the Haymarket Post Office and Winterham, and the Madison Alternative Route may have no impact on Winterham.

The NRHP-eligible Masonic Temple (233-5015) is within the 0.5-mile buffer of the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, and Railroad Alternative Routes. The Masonic Temple is a two-story building. The VDHR has acknowledged the area surrounding the property lacks historic integrity given the extent of modern development. Views of the routes will be obscured by existing development and vegetation, though the I-66 Hybrid Alternative Route will not be visible since the route will be underground. It is recommended that the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, and Railroad Alternative Routes may have no impact on the Masonic Temple.

The NRHP-eligible Gainesville District School (076-5381) is within the 0.5-mile buffer of the I-66 Hybrid Alternative, I-66 Overhead Alternative, and Railroad Alternative Routes. The Gainesville District School is an excellent example of 1930's Art Deco school design. The I-66 Hybrid Alternative and Railroad Alternative Routes will not be visible from the school, given the I-66 Hybrid Alternative Route will be underground and views of the Railroad Alternative Route will be obscured by a housing development. The I-66 Overhead Alternative Route may be visible from the property; however, due to the modern housing and commercial development that has occurred surrounding the school, it is unlikely the route will be a visual intrusion to the school. It is recommended that the I-66 Hybrid Alternative and Railroad Alternative Routes may have no impact, while the I-66 Overhead Alternative Route may have minimal impact on the Gainesville District School.

The NRHP-eligible Woodlawn (076-0122) is within the 0.5-mile buffer of the Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes. Woodlawn is a 1½- and 2-story house and tree-lined lane situated on 206 acres. The house is not occupied and in poor condition. Between the distance and/or existing vegetation, both the Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes may not be visible from the property. Therefore, it is recommended that the Carver Road Alternative and Railroad Alternative Routes may have no impact on Woodlawn, while the Madison Alternative Route could have a minimal impact on the property.

The NRHP-eligible Buckland Hall (076-0032) and Southern Railway Depot at Thoroughfare (076- 0151) are within the 0.5-mile buffer of the New Road Alternative and Wheeler Alternative Routes. Buckland Hall is a 500-acre horse breeding farm constructed in the late eighteenth century and expanded in the nineteenth century. The property, which is under a historic preservation and open-space easement, consists of a two-story dwelling, several outbuildings, and a late eighteenth century cemetery. A portion of the property is included in the expanded Buckland Historic District boundaries. The main house and surrounding property remain in good condition and views from the property are protected by rolling terrain and trees; therefore, it is recommended that the New Road Alternative and Wheeler Alternative Routes may have a minimal impact on Buckland Hall. The Southern Railway Depot at Thoroughfare served as a combination station with waiting rooms, an office, and a warehouse. The depot has since been relocated 0.25 mile west of its original location on the railroad line, altering its setting; however, the building is largely unchanged and remains within the Thoroughfare Historic District, which still retains its character and relatively rural setting. Therefore, it is recommended that the New Road Alternative and Wheeler Alternative Routes may have a moderate impact on the Southern Railway Depot at Thoroughfare.

In addition to Buckland Hall, there are several conservation easements associated with the Buckland Mills Battlefield or the Buckland Historic District and Boundary Increase located between 0.1 and 1.0 mile of the New Road Alternative and Wheeler Alternative Routes. These conservation easements include historic preservation and open-space easements and are administered by the VDHR through its Historic Preservation Easement Program and through the Land and Water Conservation Fund Act (16 U.S.C 4601-6(f)(3)) Civil War Battlefield Land Acquisition Grants awarded by the NPS ABPP. Of these conservation easements, eight have been assigned VDHR IDs and are currently recorded as unevaluated for listing in the NRHP: Buckland Commons (076-0313-0049); Tract, 7810 James Madison Highway (076-0313-0050); Broad Run Tract (076-1313-0051); Cerro Gordo tract (076-0313-0052); Buckland Tavern (076-0033); Buckland Grist Mill (076-0112); Samuel Love's Store (076-0113); and John Trone House (076-0123). Two of these easements (076-0313-0050 and 076-0313-0052) are also located between 0.75 and 1.0 mile of the Madison Alternative Route. None of these conservation easements associated with Buckland Mills Battlefield or the Buckland Historic District and

Boundary Increase are crossed by the Madison Alternative, New Road Alternative, or Wheeler Alternative Route rights-of-way.

The NRHP-eligible Henry T. George Farm (076-0469) Spencer-Vermillion House (076-0095) are within the 0.5-mile buffer of the New Road Alternative Route. The Henry T. George Farm is comprised of a two-story dwelling, which has changed little since its construction, and a complex of agricultural buildings. The Spencer-Vermillion House currently encompasses 12 acres surrounded by trees and sits atop a slight rise. Although there are trees bordering the property, the route will likely be visible since the dwelling is on a knoll. Given the route will likely be visible from both properties, it is recommended that the New Road Alternative Route may have a moderate impact on the Henry T. George Farm and Spencer-Vermillion House.

To ensure consideration of impacts on historic resources, the Pre-Application Analysis recommended in Section I of the VDHR's *Guidelines*, including ground photography from public access points, balloon flights at five representative locations, and aerial photography review, was completed to assess visual impacts on known NRHP-eligible or -listed historic and architectural resources within the tiered study area. This Pre-Application Analysis is included in Appendix C. Once the SCC approves an alternative, data gathered on the possible effects of the proposed route on known cultural resources will be considered to assist in the development of ways to avoid, minimize, or mitigate effects on cultural resources in consultation with the VDHR.

In addition to previously recorded cultural resources, the Prince William County Comprehensive Plan identifies prehistoric and historic high sensitivity areas. These areas delineate locations known or believed to possess a heightened sensitivity for containing undocumented sites. The Carver Road Alternative, I-66 Hybrid Alternative, Madison Alternative, and Railroad Alternative Routes all cross Historic High Sensitivity Areas located to the south of I-66 between U.S. 15 and U.S. 29. The Carver Road Alternative and Madison Alternative Routes cross 0.4 mile of Historic High Sensitivity Areas, while the I-66 Hybrid Alternative crosses 0.3 mile, and the Railroad Alternative Route crosses 0.9 mile of Historic High Sensitivity Areas (Table 4-1). The New Road Alternative Route crosses 0.4 mile of Prehistoric High Sensitivity Areas found along Chestnut Lick and Bull Run streams (Table 4-1). The I-66 Overhead Alternative, Northern Alternative, and Wheeler Alternative Routes do not cross any prehistoric or historic high sensitivity areas as defined by Prince William County.

Previous survey data suggests that extensive cultural resources survey has occurred across the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes with approximately 74 to 80 percent survey coverage, respectively. The Carver Road Alternative, Railroad Alternative, and Madison Alternative Routes have moderate previous cultural resources survey coverage with 41 percent of the Madison Alternative Route, 48 percent of the Carver Road Alternative Route, and 59 percent of the Railroad Alternative Route. The Northern Alternative, New Road Alternative, and Wheeler Alternative Routes remain largely unsurveyed. Approximately 26 percent of the Northern Alternative Route has been subjected to cultural resources survey, while only 15 percent of the New Road Alternative Route and 5 percent of the Wheeler Alternative Route have been previously surveyed. Nevertheless, possible impacts on unrecorded and/or unevaluated archaeological and architectural resources have not been assessed. In accordance with Section II of the VDHR's *Guidelines*, archaeological and architectural survey may be warranted prior to construction of the SCC-approved route to assess direct and indirect impacts on VLR- and NRHP-listed or -eligible resources. Dominion will determine whether survey is needed in consultation with the VDHR.

The potential direct impact on archaeological and architectural resources within the right-of-way is greater on the Northern Alternative, New Road Alternative, and Wheeler Alternative Routes. The potential indirect visual impact on properties eligible for and listed in the NRHP is greater on the New Road Alternative Route, with the Wheeler Alternative Route following at a close second. The I-66 Hybrid Alternative Route has the least potential for indirect visual impacts on properties eligible for and listed in the NRHP, given the route would utilize both overhead and underground transmission facilities. The potential indirect visual impact on properties eligible for and listed in the NRHP does not have a noteworthy variance between the remaining four route alternatives analyzed given they would have a similar recommended level of indirect impact on the sites identified within the tiered study area; however, the Northern Alternative Route has the potential to moderately impact two resources, whereas the remaining four routes have the potential to moderately impact one resource. The impact was assessed as severe for the Thoroughfare Historic District and Buckland Mills Battlefield for the New Road Alternative and Wheeler Alternative Routes. The impact was assessed as moderate for the following properties: the Second Battle of Manassas for the Carver Road, I-66 Hybrid, I-66 Overhead, Madison, Northern, and Railroad Alternative Routes; the Thoroughfare Gap Battlefield and Southern Railway Depot at Thoroughfare for the New Road and Wheeler Alternative Routes; the Spencer-Vermillion House and Henry T. George Farm for the New Road Alternative Route; and the Buckland Mills Battlefield for the Northern Alternative Route. The eight routes were assessed as having minimal or no indirect impacts on the remaining properties identified within the tiered study area.

#### **4.5 Geological Constraints**

The Madison Alternative, Railroad Alternative, Carver Road Alternative, I-66 Overhead Alternative, and the I-66 Hybrid Alternative Routes are all routed to avoid the Cedar Mountain Stone and Chemung Contracting facility owned and operated by Dalrymple Companies. The routes are located within 0.25 mile of the facility, however, they are all on the opposite side of I-66 and therefore would not impact any plans for future expansion of the facility.

#### **4.6 Engineering Constraints**

The engineering constraints vary among the eight alternatives. The lengths of the routes range from a low of 5.0 miles (I-66 Overhead Alternative Route) to a high of 21.2 miles (New Road Alternative Route). The routes have between 9 and 26 road crossings and between zero and 3 railroad crossings. Lastly, the routes have between none and 15 existing electric transmission or distribution line crossings.

Numerous discussions with VDOT have occurred regarding use of their limited access rights-of-way for both the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes. Preliminary conditional approval for such use is pending. Several engineering constraints such as existing underground utilities to work around; proposed and future road projects to consider; working within the same footprint as VDOT contractors during utility installation with road improvement projects ongoing; consideration of proposed storm water ponds; future relocation costs if required to move by VDOT; and future location for Dominion facilities if required to move due to additional highway projects.

Additional constraints involve residences located within the right-of-way or as close as 100 feet from the centerline; mitigation costs and requirements with regards to historic/cultural resources; permanent wetland impacts, forest removal and costs associated with removing land and replacing lands associated with protected open space conservation easements; working with

localities for future land developments; and structure placement to minimize impacts as well as construction and maintenance access.

#### 4.7 Routing Opportunities

The use of routing opportunities along each route varies among the eight alternatives. The routes each parallel existing rights-of-way (road, railroad, and existing utilities) for between about 34 and 94 percent of their total length. The Northern Alternative and the Wheeler Alternative Routes are 46 percent and 34 percent collocated respectively. The Carver Road Alternative Route is 66 percent collocated, the Madison Alternative Route is 70 percent, the Railroad Alternative Route is 80 percent, and the New Road Alternative Route is 67 percent collocated with existing rights-of-way. The I-66 Overhead Alternative Route and the I-66 Hybrid Alternative have the highest percentages of collocation at 90 and 94 percent respectively.

#### 5.0 ANALYSIS OF ALTERNATIVES

Eight route alternatives (New Road Alternative, Northern Alternative, Railroad Alternative, Carver Road Alternative, Madison Alternative, Wheeler Alternative, I-66 Overhead Alternative, and I-66 Hybrid Alternative Routes) were identified for the Haymarket transmission line. During analysis of these alternatives, three routes (New Road Alternative, Wheeler Alternative and Northern Alternative Routes) were determined to have technical nuances affecting their electrical viability, greater construction obstacles, permitting uncertainty, and environmental impacts and were therefore removed from further consideration. Disadvantages of these routes are listed in table 5-1.

TABLE 5-1 Haymarket Substation and 230 kV Transmission Line Project Summary of the Disadvantages of Routes No Longer Under Consideration	
<b>New Road Alternative</b>	<ul style="list-style-type: none"> <li>• Longest route by 16.2 miles</li> <li>• Largest amount of wetland impacts (acres), would impact 16.1 more acres than any of the recommended routes</li> <li>• Crosses the highest number of privately owned parcels, twice as much as any of the other routes alternatives</li> <li>• Crosses one recreation area, none of the recommended routes cross any recreation areas</li> <li>• Crosses five more existing subdivisions than any of the recommended routes</li> <li>• Longest crossing of the Rural Crescent, 15.4 more miles than any of the recommended routes</li> <li>• Highest number of waterbody crossings, 26 more than any of the recommended routes</li> <li>• Largest amount of forest impacts (acres), would impact more than twice as much as any other route alternative</li> <li>• Only route to have residences (3) within the right-of-way</li> <li>• Highest number of archaeological sites within the right-of-way</li> <li>• Highest number of architectural resources within the right-of-way</li> <li>• Longest length of historic districts crossed, 0.5 mile versus 0.0 for recommended routes</li> <li>• Crosses 5.5 more miles of NRHP-Eligible battlefields than any of the recommended routes</li> </ul>
<b>Wheeler Alternative</b>	<ul style="list-style-type: none"> <li>• Second longest route</li> <li>• Crosses 0.1 mile of Town of Manassas owned land</li> <li>• Second longest crossing of the Rural Crescent, 4.2 more miles than any of the recommended routes</li> <li>• Lowest percentage of collocation (34 percent)</li> <li>• Second highest number of archaeological sites within right-of-way</li> <li>• Second longest length of historic districts crossed, 0.4 mile versus 0.0 for recommended routes</li> <li>• Crosses 3.1 more miles of NRHP-Eligible battlefields than any of the recommended routes</li> <li>• Uncertainty around electrical solution pending SCC review/approval of other projects; footprint undetermined</li> </ul>



Haymarket Substation and 230 kV Transmission Line Project  
Environmental Routing Study

TABLE 5-1

Haymarket Substation and 230 kV Transmission Line Project  
Summary of the Disadvantages of Routes No Longer Under Consideration

**Northern Alternative**

- Crosses 0.9 mile of the Conway-Robinson Memorial State Forest. Only route to cross state owned land
- Second largest amount of wetland impacts (acres), would impact 14.0 more acres than any of the recommended routes
- Crosses three recreation areas, none of the recommended routes cross any recreation areas
- Second highest number of waterbody crossings, 16 more than any of the recommended routes
- Crosses the most PWC Protected Open Space, 2.3 miles more than any of the recommended routes
- Only route to cross any VDCR Conservation lands; permitting timeline uncertainty
- Second lowest percentage of collocation (46 percent)

The remaining five routes are continued through the analysis of alternatives below. Table 5-2 summarizes the advantages and disadvantages of each route relative to the other alternatives recommended for consideration by the SCC.

Based on the above discussion, considerations relevant to selecting a proposed route from the five alternatives are presented below.

TABLE 5-2

Haymarket Substation and 230 kV Transmission Line Project  
Summary of the Advantages and Disadvantages of Each of the Recommended Routes

Advantages	Disadvantages
<b>Carver Road Alternative</b>	
<ul style="list-style-type: none"> <li>• Crosses no permanently protected open space or other conservation easements</li> <li>• Second lowest number of residences within 100 feet</li> <li>• Tied for the greatest amount of industrial zoned lands</li> <li>• No architectural resources within right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>• Second longest route</li> <li>• Second highest amount (acres) of wetland impacts</li> <li>• Second highest amount (acres) for forested impacts</li> <li>• Tied for crossing the highest number of private parcels</li> <li>• Tied for crossing greatest amount of residential zoned lands</li> <li>• Tied for containing greatest number of archaeological sites within right-of-way</li> <li>• Lowest percent collocation (66%)</li> </ul>
<b>I-66 Hybrid Alternative</b>	
<ul style="list-style-type: none"> <li>• Second shortest route</li> <li>• Does not cross the Rural Crescent</li> <li>• Crosses fewest planned developments</li> <li>• Crosses least amount of forested land (acres)</li> <li>• No architectural resources within right-of-way</li> <li>• Greatest percent collocation (94%)</li> <li>• Least amount of wetlands impacts (acres)</li> <li>• Fewest number of private parcels crossed</li> <li>• No buildings within right-of-way</li> <li>• No architectural resources within right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>• Greatest number of single family homes within 100 feet</li> <li>• Greatest number of townhomes/condo buildings within 100 feet</li> <li>• Requiring lengthy underground construction process</li> <li>• Tied for crossing greatest number of existing subdivisions/HOAs</li> <li>• Repair of underground segment requires more time than overhead</li> <li>• Would be required to relocate line if additional I-66 expansions are needed</li> <li>• Significant greater cost</li> </ul>
<b>I-66 Overhead Alternative</b>	
<ul style="list-style-type: none"> <li>• Shortest route</li> <li>• Does not cross the Rural Crescent</li> <li>• No architectural resources within ROW</li> <li>• Crosses least amount of NRHP-eligible battlefield</li> <li>• Second greatest percent collocation (90%)</li> <li>• Second least amount of forested land (acres) crossed</li> <li>• Second least amount of wetland impacts (acres)</li> <li>• Second fewest number of private parcels crossed</li> <li>• No buildings within right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>• Second greatest number of townhome/condo buildings within 100 feet.</li> <li>• Second greatest number of single family homes within 100 feet.</li> <li>• Would be required to relocate line if additional I-66 expansions are needed</li> <li>• Tied for containing greatest number of archaeological sites within right-of-way</li> </ul>

TABLE 5-2	
Haymarket Substation and 230 kV Transmission Line Project Summary of the Advantages and Disadvantages of Each of the Recommended Routes	
Advantages	Disadvantages
<ul style="list-style-type: none"> <li>No architectural resources within right-of-way</li> <li>Shortest distance on NRHP-Eligible battlefields crossed</li> <li>Only proposed route to not cross any historic high sensitivity areas</li> </ul>	
<b>Madison Alternative</b> <ul style="list-style-type: none"> <li>Crosses no permanently protected open space</li> <li>Tied for the greatest amount of industrial zoned lands</li> <li>No buildings within right-of-way</li> </ul>	<ul style="list-style-type: none"> <li>Longest route</li> <li>Crosses greatest number of planned developments</li> <li>Greatest length parallel to scenic byway</li> <li>Crosses greatest number of private parcels</li> <li>Crosses the greatest amount of forests land (acres)</li> <li>Crosses the greatest amount of Rural Crescent</li> <li>Crosses a Northern Virginia Conservation Trust easement</li> <li>Crosses the second greatest amount of wetlands</li> </ul>
<b>Railroad Alternative</b> <ul style="list-style-type: none"> <li>Tied for the greatest amount of industrial zoned lands</li> <li>Third greatest percent collocation (80%)</li> <li>Only proposed route to have no residences located within 200 feet</li> </ul>	<ul style="list-style-type: none"> <li>Tied for crossing greatest number of existing subdivisions/HOAs</li> <li>Greatest amount of wetland impacts (acres)</li> <li>Greatest number of waterbody crossings</li> <li>Greatest amount (acres) of VDOF High Forest Conservation lands crossed</li> <li>Crosses greatest amount of permanently protected open space</li> <li>Crosses a Prince William County-designated Open Space and Trail Easement</li> <li>Crosses the greatest amount of RPA</li> <li>Tied for containing greatest number of archaeological sites within right-of-way</li> </ul>

1. Length of Route – Length of route varies significantly among the five alternatives, with a difference of 3.2 miles between the shortest and longest routes (I-66 Overhead Alternative and Madison Alternative Routes, respectively). Essentially the Carver Road Alternative and Madison Alternative Routes are in Prince William County, and the I-66 Hybrid Alternative, I-66 Overhead Alternative, and Railroad Alternative Routes are primarily in Prince William County with between 0.2 and 1.0 mile in the Town of Haymarket.
2. Crossings of Planned Developments – Although each of the routes crosses planned developments, Madison Alternative Route crosses 2.5 miles of these areas, while the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes only cross 0.3 mile and 0.4 mile of planned developments respectively. Several of the planned developments have not yet been approved by Prince William County and are only in the rezoning application phase, meaning that the developments could be configured around a transmission line. Nonetheless, construction of each route could limit or restrict future development of the areas.
3. Proximity to Residences and – None of the routes have residences within the proposed right-of-way, and each of the routes, except Railroad Alternative Route, have residences within 100 feet of the centerline. Both the I-66 Hybrid Alternative (13 single family homes and 21 townhome/condo buildings) and I-66 Overhead Alternative (5 single family homes and 17 townhome/condo buildings)

Routes have a substantial number of more residences within 100 feet of the centerline.

4. **Forested Lands Crossed** – The amount of forested land that would require clearing varies significantly among the routes, and the quality of the forest clearing varies as well. The I-66 Hybrid Alternative and I-66 Overhead Alternative Routes cross the least amount of forested area primarily due to their position along the north side of the interstate right-of-way (an area which has been developed and cleared of trees). These alternative routes also do not cross any VDOF High Forest Conservation Value forests. The Madison Alternative Route crosses the most forest land at 61.6 acres and the Carver Alternative Route crosses the second highest amount of forested land at 46.2 acres.
5. **Wetlands Crossed** – The amount and types of wetlands crossed by the routes also varies between the routes. The I-66 Hybrid Alternative and I-66 Overhead Alternative Routes have the least amount of wetland impacts at 5.1 and 5.9 acres respectively. The Railroad Alternative Route has the greatest amount of wetland impacts (20.8 acres) and the Carver Road Alternative and Madison Alternative Routes have 11.5 and 11.3 acres of impacts respectively.
6. **Cultural Resource Impacts** – Impacts to various cultural resources varies among the five alternatives, however generally favors the I-66 Hybrid Alternative and I-66 Overhead Alternative Routes. Both of these alternatives have no architectural resources within the right-of-way, shortest length (preferring the I-66 Overhead Alternative Route) of NRHP-Eligible battlefields crossed, shortest length (preferring the I-66 Overhead Route) of historic high sensitivity areas crossed, and tied for shortest length of core battlefield areas crossed.
7. **Routing Opportunities** – The amount of collocation with existing rights-of-way varies significantly among the five alternatives, from 66 percent along the Carver Alternative Route to 94 percent for the I-66 Hybrid Alternative Route and 90 percent for the I-66 Overhead Alternative Route.

## **6.0 CONCLUSIONS AND RECOMMENDATION**

Given the varying lengths of the routes evaluated, environmental features impacted vary substantially based on the existing rights-of-way followed or the number of the resources crossed or potentially affected as shown above. The project length is generally comparable for the Railroad Alternative, the I-66 Hybrid Alternative, and I-66 Overhead Alternative Routes, and the Carver Road Alternative and Madison Alternative Routes. The specific resources associated with some or all of the route alternatives which have a noteworthy variance include the following:

- Length;
- Proximity to residential areas;
- Crossings of planned future developments
- Length of forested lands crossed;
- Acres of wetland impacts;
- Cultural resource impacts; and
- Length of collocation opportunities.

Considering the factors discussed in this report and listed above, NRG reached the following conclusions:

1. The Railroad Alternative Route was preliminarily identified by the Company as the preferred alternative that could meet the need and seemed to be the route that would reasonably minimize adverse impacts. However, on December 11, 2014, the Prince William County Board of County Supervisors voted to approve the conveyance of a property interest by the property owner, a Home Owners' Association to Prince William County, rendering this alternative unable to be built without agreement by the County. The County has preliminarily indicated to the Company that it will not permit an overhead transmission line to be constructed across its property interest as would be required for this routing alternative. However, as the alternative route that impacts the least number of residences within 100 feet of the centerline (0 residences), the Company still seeks to notice the Railroad Alternative Route in the event agreement with Prince William County can be reached.
2. The Carver Road Alternative and Madison Alternative Routes are less favorable than the Railroad Alternative Route, but they limit crossings of county-owned lands to dedicated roads and avoid potential impacts on the Buckland Mills Battlefield. Aside from the Madison Alternative Route being longer, and the associated increases in resource impacts due to the increased length, the Madison Alternative Route would cross a privately owned Northern Virginia Conservation Trust easement. Both alternatives maximize crossings of industrial-zoned lands and avoid permanently protected open space. While the Carver Road Alternative and Madison Alternative Routes would have fewer single family and townhome/condos within 100 feet of the route than the I-66 Hybrid and Overhead Alternative Routes, they would have greater impacts to forest land clearing and wetland impacts. They would also cross more waterbodies than the I-66 Hybrid and Overhead Alternative Routes. For these reasons, the routes were not proposed.
3. The I-66 Hybrid Alternative and Overhead Alternative Routes are more favorable than the Carver Road Alternative and Madison Alternative Routes based on their shorter length, greater extent of collocation, minimized impacts on cultural resources, fewer impacts on private lands, and significantly less impacts on forests and wetlands. Prince William County has indicated support for the I-66 Hybrid Alternative Route; however, the significantly higher cost and longer construction schedule associated with the construction of the I-66 Hybrid Alternative Route burden that route. For these reasons, the I-66 Overhead Alternative Route was identified as the Proposed Route, and the remaining Alternative Routes were identified as Alternative Routes for the SCC's consideration.

### **Minor Variations**

Following selection of a Proposed Route, two minor route variations were identified for consideration as potential improvements to the Proposed Route. These two variations, the Jordan Lane Variation and the Walmart Variation, are discussed below.

#### **Jordan Lane Variation**

Approximately 675 feet of existing roadway along Jordan Lane within Haymarket Township was not taken into the VDOT system or established as VDOT right-of-way.

This stretch of Jordan Lane currently remains a county road dedicated to the Town of Haymarket and Prince William County via Piedmont Mews, LLC subdivision. Dominion will work with these local governments to negotiate an overhang easement within the dedicated road easement. However, if these negotiations are unsuccessful, the minor Jordan Lane Variation would allow the general alignment of the I-66 Overhead Alternative Route (Proposed Route) to be retained while eliminating the need for an easement from the Town of Haymarket or Prince William County. The general intent of the I-66 alignment was to locate transmission line structures outside of the sound wall along I-66 to reduce the restrictions on construction due to the need for potential lane closures and/or construction timing (daily) restrictions. The Jordan Lane Variation would involve the location of one structure inside the proposed sound wall along I-66, but this single structure is not expected to unnecessarily burden construction or operation of the transmission line or impede construction or vehicle operations within the existing I-66 right-of-way. This variation would not result in perceptible changes to the length or impacts of the Proposed Route with the exception of eliminating a crossing of the Jordan Lane dedicated road parcel. The Jordan Lane Variation is shown on Figure 19.

#### Walmart Variation

The Walmart Variation is under consideration to limit the amount of tree removal and exposure along John Marshall Highway (SR 55) across the frontage of the three parcels preceding (east of) the proposed substation parcel. The Walmart Variation would deviate from the Proposed Route just prior to the crossing of James Madison Highway (U.S. 15), proceeding behind several stores in Haymarket Village Center, primarily Kohl's and Walmart. The route would generally follow the property line between the shopping center and VDOT right-of-way. The route would generally follow the western edge of the shopping center property south with a short segment extending west before crossing John Marshall Highway (SR 55) and entering the proposed substation. By traversing the rear and west edges of the shopping center, the transmission line would be less visible to local traffic. The Walmart Variation would be approximately 0.1 miles longer than the Proposed Route, cross 1 more private parcel, and have 0.4 miles of co-location (compared to 0.5 miles of the Proposed Route). Although tree clearing would be higher along the variation (4.1 acres compared to 2.0 acres), the tree clearing required for the Walmart Variation would be less conspicuous to local traffic. There would be no tangible change to cultural resource impacts due to this variation. The Walmart Variation is shown on Figure 19.

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